

# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

RECEIVED

SEP 24 1985

DIVISION OF OIL  
GAS & MINING

Notice of Intention to Commence Mining Operations  
and

Application for  
Mining and Reclamation Plan

for

Lisbon Valley Copper Mine and Mill

Located In

T30S, R25E, Secs. 25, 26 and 36 SLBM

San Juan County, Utah



MEL SWANSON  
CHIEF ENGINEER  
CONTRACT MINING – EXPLORATION

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SEP 24 1985

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STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
Telephone: (801) 538-5340

NOTICE OF INTENTION TO COMMENCE MINING OPERATIONS  
and  
MINING AND RECLAMATION PLAN

Based on Provisions of the Mined Land Reclamation Act, Title 40-8, Utah Code Annotated 1953, General Rules and Regulations and Rules of Practice and Procedures, By Order of the Board of Oil, Gas and Mining.

Mine Name: Lisbon Valley Copper Mine Plan Date: October, 1985  
File No.: PEO 037/032 Date Received: \_\_\_\_\_  
Operator: Kelmine Corporation DOGM Lead Reviewer: \_\_\_\_\_  
Mineral(s) to be Mined: Copper Ores

Please attach other sheets as needed and include cross-reference page numbers when used.

1. Name of Applicant or Company: Kelmine Corporation  
Corporation (X) Partnership ( ) Individual ( )
2. Address: Permanent: 4901 York Street, Denver, Colorado 80216  
Temporary: P.O. Box 1383, Moab, Utah 84532
3. Company Representative: Name: Melvin R. Swanson  
Title: Manager/Engineer  
Address: P.O. Box 1383, Moab, Ut. 84532 Phone: (801) 259-6711
4. Location of Operation: County(ies) San Juan  
Township(s): T30S Range(s): R25E Section(s): 25  
Township(s): T30S Range(s): R25E Section(s): 26  
Township(s): T30S Range(s): R25E Section(s): 36
5. Owner(s) of record of the surface area within the land to be affected:  
Name: BLM, Moab Dist. (Sec.25,26) Address: 82 Dogwood Ave., Moab, Ut. 84532  
Name: Max Wilcox (Sec. 36) Address: Box 236, La Sal, Utah 84530  
Name: \_\_\_\_\_ Address: \_\_\_\_\_  
Name: \_\_\_\_\_ Address: \_\_\_\_\_

6. Owner(s) of record of the minerals to be mined:

Name: <u>Ray Kunkel (Sec. 25, 26)</u>	Address: <u>33 Holiday Haven, Moab, Ut. 84532</u>
Name: <u>Ray Kunkel (Sec. 36)</u>	Address: <u>33 Holiday Haven, Moab, Ut. 84532</u>
Name: _____	Address: _____
Name: _____	Address: _____

See Page 24 for Property Map.

7. Owner(s) of record of all other minerals, including oil and gas, within any part of the land to be affected: See page 16.

Name: <u>Karl F. Meyars, Uranium</u>	Address: <u>P.O. Box 1408, Corrales, N.M. 87048</u>
<del>Name:</del> <u>King Corp. (Sec. 36, SW<math>\frac{1}{4}</math>)</u>	<del>Address:</del> _____
Name: <u>Joseph Costanza (Sec. 36, NE, NW, SE<math>\frac{1}{4}</math>)</u>	Address: <u>484 Sundial, Moab, Utah 84532</u>

8. Have the above owners been notified in writing? (x) Yes, ( ) No. If no, why not? See attached letters beginning on page 17.

9. Have you or any other person, partnership or corporation associated with you received an approval of a Notice of Intention to Commence Mining Operations by the State of Utah for operations other than described herein? ☒ Yes, ( ) No. If yes, list all approval numbers now under surety:

Cub Mine	ACT/037/044	_____
Oljeto	ACT/037/029 - Reclaimed	_____

10. Source of Operator's legal right to enter and conduct operations on the land to be covered by this Notice:

Minerals Lease from owner of Copper Rights. See attached page 25.

11. Give the names and mailing addresses of every principal Executive, Office, Partner (or person performing a similar function) of Applicant:

	Name	Title	Address
A.	<u>C. O. Keller</u>	<u>President</u>	<u>4901 York St., Denver, Co.</u>
B.	_____	_____	_____
C.	_____	_____	_____
D.	_____	_____	_____

12. Has the Applicant, any subsidiary or affiliate or any person, partnership, association, trust or corporation controlled by or under common control with the Applicant, or any person required to be identified by Item 11 ever had an approval of a Notice of Intention to Mine or Explore withdrawn or has surety relating thereto ever been forfeited? ( ) Yes, (x) No.

If yes, please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Please note: Section 40-8-13 of the Act provides that information relating to the location, size or nature of the deposit, and marked confidential by the Operator, shall be protected as confidential information by the Board and the Division and not be a matter of public record in the absence of a written release from the Operator, or until the mining operation has been terminated as provided in Subsection (2) of Section 40-8-21 of the Act. This material should be so marked and included on separate cross-referenced sheets.

13. All maps and plans prepared for submission shall be of adequate scale and detail to show topographic features and clearly indicate the following details: See Pockets A, B and C.

- A. Location and delineation of the extent of the land previously affected, as well as the proposed surface disturbance.
- B. Existing active or inactive, underground or surface mined areas.
- C. Boundaries of surface properties, including ownership.
- D. Names and locations of:
  - (1) Lakes, rivers, streams, creeks and springs.
  - (2) Roads, highways and buildings.
  - (3) Active or abandoned facilities.
  - (4) Transmission lines within 500 feet of the exterior limits of land affected.
  - (5) Gas and/or oil pipelines.
  - (6) Site elevation.
- E. Drainage patterns of land affected:
  - (1) Overburden or topsoil removal and storage areas.
  - (2) Areas susceptible to erosion.
  - (3) Natural waterways.
  - (4) Constructed drainages, diversions, berms and sediment ponds (design calculations shall be included).
  - (5) Receiving waters (State Health classification).
  - (6) Directional flow of all surface waters (indicated by arrows).
- F. Known drill holes:
  - (1) Location.
  - (2) Status.

- (3) Depths and thicknesses of:
  - a. Water bearing strata.
  - b. Mineral deposits.
  - c. Toxic or potentially toxic materials.
  - d. Surficial or plant supporting material (topsoil and subsoil).
- G. Locations of disposal and stockpile areas:
  - (1) Topsoil and subsoil storage areas.
  - (2) Overburden storage area.
  - (3) Waste, tailings, rejected materials.
  - (4) Raw ore stockpile(s).
  - (5) Tailings-ponds and other sediment control structures.
  - (6) Discharge points, water effluents (see #15[D]).

All maps should have a color code or other suitable legend used in preparation to clearly indicate surface features of the land affected. A general reference map completed on a 7.5 (1:24,000) USGS quadrangle sheet is recommended with additional large scale maps included for practical delineation of individual facilities, (e.g., 1:200, 1:500).

14. Acreage to be disturbed:

- A. Minesite (operating, storage, disposal areas, etc.): 16.8 acres new disturbance
- B. Access/haul roads/conveyors: 6.65 acres new disturbance
- C. Associated on-site processing facilities: 50.0 acres new disturbance

15. Describe mining method to be employed, including:

- A. Mining sequence:
  - (1) Map delineating the yearly sequential disturbance (if surface mine) and/or surficial disturbance.
  - (2) Narrative (including on-site processing or mineral treatment):  
See page 33.

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\_\_\_\_\_  
\_\_\_\_\_  
Attach supplemental sheets and/or diagrams as necessary with cross reference to page number here: Page 33.

\_\_\_\_\_  
\*Stratigraphic or lithologic logs if correlated to footage depths may be presented when labeled (maps or logs should be labeled confidential, if so desired).

- B. If sedimentary deposit seam(s):  
(1) Thickness(es): Variable, 5 to 20 feet.  
(2) Dip: Variable  
(3) Outcrop: Dakota Formation. (See Geology Map in Pocket C).

- C. Will any underground workings or aquifers be encountered? ( ) Yes,  
(X) No. If yes, describe potential impacts and protection measures  
to be taken: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- D. Describe any active discharge or proposed discharge of water from  
mine or site area. Include water quality data and lab test reports.  
If attached sheets or reports are included, cross reference to page  
number here: Page 33.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

16. Have all necessary water rights been appropriated? (X) Yes, ( ) No. How  
will water be obtained? Please explain: See page 53.  
\_\_\_\_\_  
\_\_\_\_\_

17. Proposed or estimated duration of mining operation: 9 to 10 years  
Will the permit term be for a lesser amount of time, subject to review?  
(e.g., for surety estimate reasons). ( ) Yes, (X) No. If yes, how long?  
\_\_\_\_\_  
\_\_\_\_\_

18. Describe the construction and maintenance of access roads including:  
A. Procedures (drainage and erosion control methods).  
B. Cross section(s).  
C. Profile(s) of proposed road grade(s).

See page 66.  
\_\_\_\_\_  
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Attach supplemental diagrams and cross reference to page number  
here: Page 66.

19. Prior land use(s): See Page 70.  
Current land use(s): See Page 70.  
Possible projected or prospective future land use(s): See Page 70.

20. Describe methods of tree and brush removal: See Page 70.

Provide estimate of, and method of obtaining existing vegetation cover (%):  
See Page 70.

What types of dominant vegetation are present? See Page 70.

Photographs and/or maps may be attached to these forms, cross reference to page number here: Page 67 to 69.

21. Soils (surficial plant supportive material) and overburden: Except where slope or rocky terrain make it impossible, all surficial materials suitable as a growth medium shall be removed, segregated and stockpiled according to its ability to support vegetation (as determined by soil analysis and/or practical revegetation experience) prior to any major excavation. (Suggested minimum requirements are the top six inches, or the "A" horizon, whichever is larger.)

- A. What is the pH range of the soil before mining? 8.6  
Name of person or agency and method of determining pH: Hazen Research, Inc. - U.S. Dept. of Agriculture Soil Survey Manual #18.  
Attach lab report if available. Cross reference page number here: Page 72.
- B. Average depth of topsoil and subsoil to be stripped and stockpiled: See Page 71. Calculated volume of soil to be stockpiled: See Page 71.
- C. Describe the method for removing and stockpiling topsoil and subsoil, including measures to protect topsoil from wind and water erosion, compaction and pollutants: See Page 71.
- D. Describe the method for removing and stockpiling overburden. Describe and discuss the acidity or alkalinity (pH) or other characteristics which would affect revegetation: See Page 71.

- E. Rock subjected to processing such as waste rock, tailings, etc., and which is to be disposed of on- or off-site must be subjected to a toxicity analysis. The method of determination, results and suitable disposal methods must be explained in detail, including means for containment and long range stability\*: EPA Toxicity Tests show the waste and tails to be below maximum threshold values for all elements tested. Also, the pH of the waste is 7.4 and the tails will be neutralized to a pH of 6.5 to 7.0. The piles will then pose no long term stability or hazard problems. (See page for Toxicity Test and page for pH.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

22. Describe the methods used to minimize public safety and welfare hazards during and after mining operations including: See Page 76.

- A. Shaft, tunnel and drill hole closure.
- B. Disposal of trash, scrap metal and wood and extraneous debris, waste oil and solvents, unusable buildings and foundations, sewage and other materials incident to mining.
- C. Posting of appropriate warning signs and/or fences or berms to act as barriers (e.g., above highwalls) in locations where public access is available.

See Page 76.

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\*"Toxic" means any chemical or biological or adverse characteristic of the material involved which could reasonably be expected to negatively affect ecological or hydrological systems or could be hazardous to the public safety and welfare.

23. Grading and soil redistribution.

- A. Attach pre- and postmining contour cross sections, typical of regrading designs. Cross reference to page number here: Page 77.
- B. Describe the method(s) of overburden replacement and stabilization and highwall elimination, including: (a) slope factors; (b) lift heights; (c) compaction; (d) terracing, etc., (e) also include testing procedures: See Page 72. 11
- C. What method of spreading topsoil and subsoil or upper horizon material on the regraded area will be employed? The reclaim material will be hauled to the reclamation site by dump truck and spread by crawler dozer with final grading by motor grader.
1. Indicate the approximate depth of soil cover after final surfacing 12 inches.
2. What tests will be performed to adequately evaluate the potential of the soil to successfully support intended revegetation? Test plots and observation.
3. What soil amendments or fertilizers will be needed as an aid to revegetation?
- |   |   |
|---|---|
| Type: <u>(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub></u> | Rate: <u>.004 lb/sq.ft. or 175 lb/acr</u> |
| Type: _____   | Rate: _____                               |
| Type: _____   | Rate: _____                               |
4. What additional surface preparations will be used? Describe (a) drainage, erosion and sediment control measures; (b) maximum slope characteristics; and (c) highwall reclamation.

Before planting and after topsoil distribution the crawler dozer will work back and forth along the slopes leaving grozer marks parallel to the contours. These will form mini-water bars and will prevent erosion on the maximum 2:1 slopes of the waste dumps. (See Topic 23B for further description).

5. Describe methods which may be particularly applicable to waste disposal areas determined to be potential problem areas.

EPA toxicity tests show no chemical problems, and the deposition techniques employed should pose no physical problems for reclaiming the waste and tails piles.

(See Page 72).

- D. Describe plans for either leaving or reclaiming the roads and pads associated with the operation.

The pads and building site reclamation are described in the previous section 23B and 22B. The haul road will be ripped and recontoured.

24. Impoundments: All evaporation, tailings and sediment ponds; spoil piles, fills, pads and regraded areas shall be self-draining and nonimpounding when abandoned unless previously approved as an impounding facility by a lawful state or federal agency. In view of this, please describe the reclamation of all related areas in the operation and include pertinent items enumerated in C, 1-5 above.

See Page 79.

25. Revegetation plans:

- A. What organization, agency or person will specifically be performing the revegetation? Kelmine Corporation
- B. Will the affected area be subject to livestock or wildlife grazing? (x) Yes, ( ) No. Will vegetation protection be needed to allow for a determination of the successful revegetation criteria outlined in the Mined Land Reclamation Act, Rule M-10(12)? ( ) Yes, (x) No. If yes, what measures will the operator take?

The grazing use is during the winter months. It is felt that with the rapid spring growth of the species used, no protection will be required. If necessary, temporary fencing will be used to protect the areas until adequate growth is established.

- C. Will irrigation be used? ( ) Yes, (x) No. Type: \_\_\_\_\_  
\_\_\_\_\_ For how long? \_\_\_\_\_

- D. Test plots initiated during the early stages of mine development provide good bases from which a successful revegetation program can be adapted for later implementation. Will test plots be employed? (X) Yes, ( ) No. If yes, describe on an additional sheet(s) and attach. Cross reference page number here and show location on facilities map: Page 80.
- E. Please attach a revegetation plan and schedule including: See Page 80.
1. Species to be used.
  2. Rate of seed application/acre.
  3. Season to be planted.
  4. Seedbed preparation techniques.
  5. Planting location, slope face direction, variability, method of application, covering, etc.
  6. Mulch and fertilizer application, if used.
- F. Describe any other maintenance procedures which may be used, if needed, to guarantee successful revegetation:  
See Page 80

26. Please provide a reclamation schedule including: See Page 81.

- A. Estimated time for construction.
- B. Estimated time for interim reclamation.
- C. Estimated duration of the mining operation.
- D. A time table for the accomplishment of each major step in the reclamation plans. Attach the schedule and cross reference to the page number here: Page 81.

27. A surety guarantee must be provided for the mining operation (see Rule M-5 Mined Land Reclamation Act). In calculating this amount, the Division will consider the following major steps based on the information provided in this report: See Page 82.

- A. Clean up and removal of structures.
- B. Backfilling, grading and contouring.
- C. Topsoil and subsoil redistribution and stabilization.
- D. Revegetation (i.e., preparation, seeding, mulching, irrigation).
- E. Labor.
- F. Safety and fencing.
- G. Monitoring, and reseeding if necessary.

To assist the Division, the operator may attach a list of costs and factors which would satisfy these areas. Substantiation of these factors, i.e., unit costs and how they are derived, should accompany the list. Cross reference the page number here: Page 82.

28. A request for a variance from specific commitments to Rule M-10 (Reclamation Standards) of the Mined Land Reclamation Act may be submitted with adequate written justification. If after presentation of information adequately detailing the situation, a determination is made that finds a portion of the rule inapplicable, a variance may be granted by the Division.

I hereby commit the applicant to comply with Rule M-10, "Reclamation Standards" in its entirety, as adopted by the Board of Oil, Gas and Mining on March 22, 1978.

The applicant will achieve the reclamation standards for the following categories as outlined in Rule M-10 on all areas of land affected by this mine, unless a variance is granted in writing by the Division.

<u>Rule</u>	<u>Category of Commitment</u>	<u>Variance Requested?</u>
M-10(1)	Land Use	_____
M-10(2)	Public Safety and Welfare	_____
M-10(3)	Impoundments	_____
M-10(4)	Slopes	_____
M-10(5)	Highwalls	_____
M-10(6)	Toxic Materials	_____
M-10(7)	Roads and Pads	_____
M-10(8)	Drainages	_____
M-10(9)	Structures and Equipment	_____
M-10(10)	Shafts and Portals	_____
M-10(11)	Sediment Control	_____
M-10(12)	Revegetation	_____
M-10(13)	Dams	_____
M-10(14)	Soils	_____

I believe a variance is justified on a site-specific basis for the previous subsections of Rule M-10 as indicated. A narrative statement explaining these concerns is attached.

STATE OF Utah

COUNTY OF Grand

I, Melvin R. Swanson, having been duly sworn depose and attest that all of the representations contained in the foregoing application are true to the best of my knowledge; that I am authorized to complete and file this application on behalf of the Applicant and this application has been executed as required by law.

Signed: Melvin R. Swanson

Taken, subscribed and sworn to before me the undersigned authority in my said county, this 23rd day of September, 1985.

Notary Public: Mary B. Kory

My Commission Expires: 1-16-89

PLEASE NOTE:

Section 40-8-13(2) of the Mined Land Reclamation Act provides for maintenance of confidentiality concerning certain portions of this report. Please check to see that any information desired to be held confidential is so labeled and included on separate sheets or maps.

Only information relating to the location, size or nature of the deposit may be protected as confidential.

Confidential Information Enclosed: ☒ Yes ( ) No

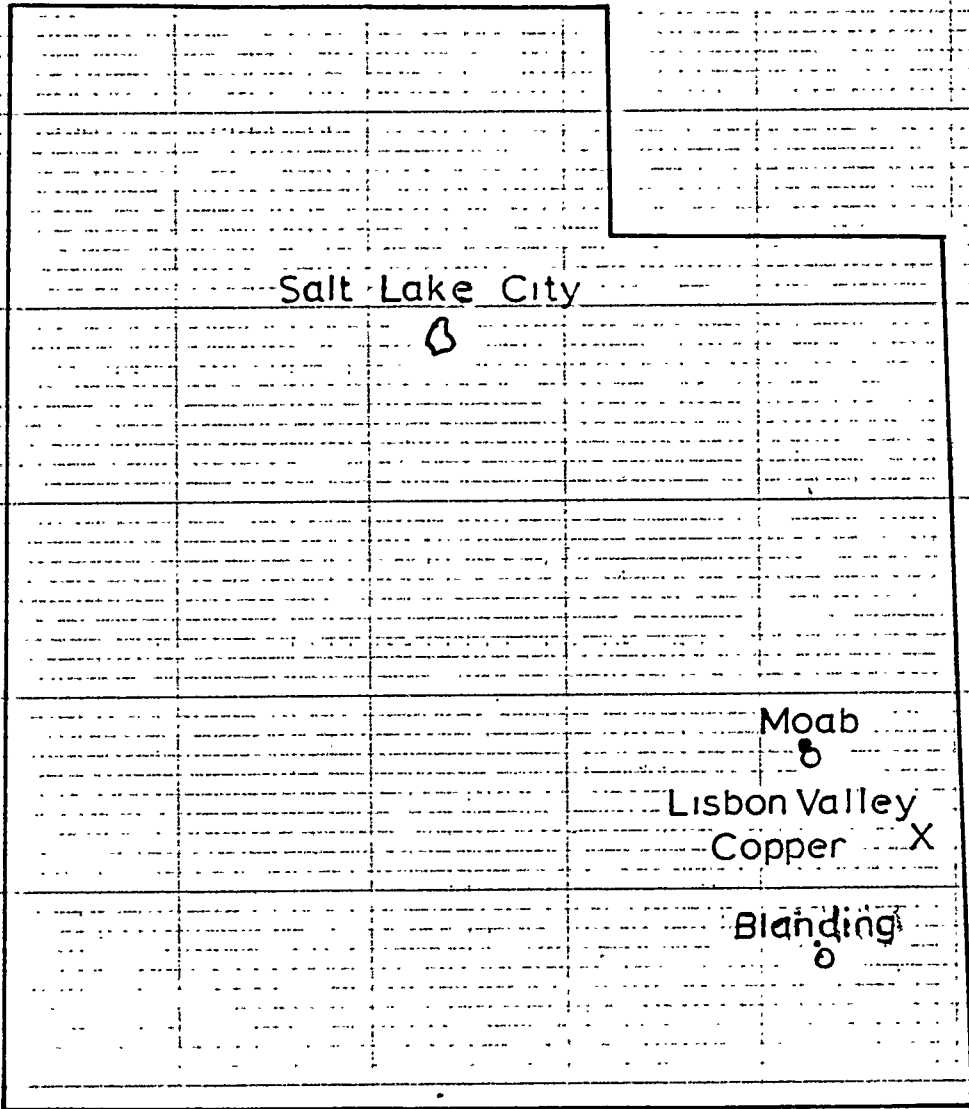
The process description by Hazen Research, Inc., and the cross sections showing assay data in Pockets B are to be held confidential.

*M.R. Sussman*

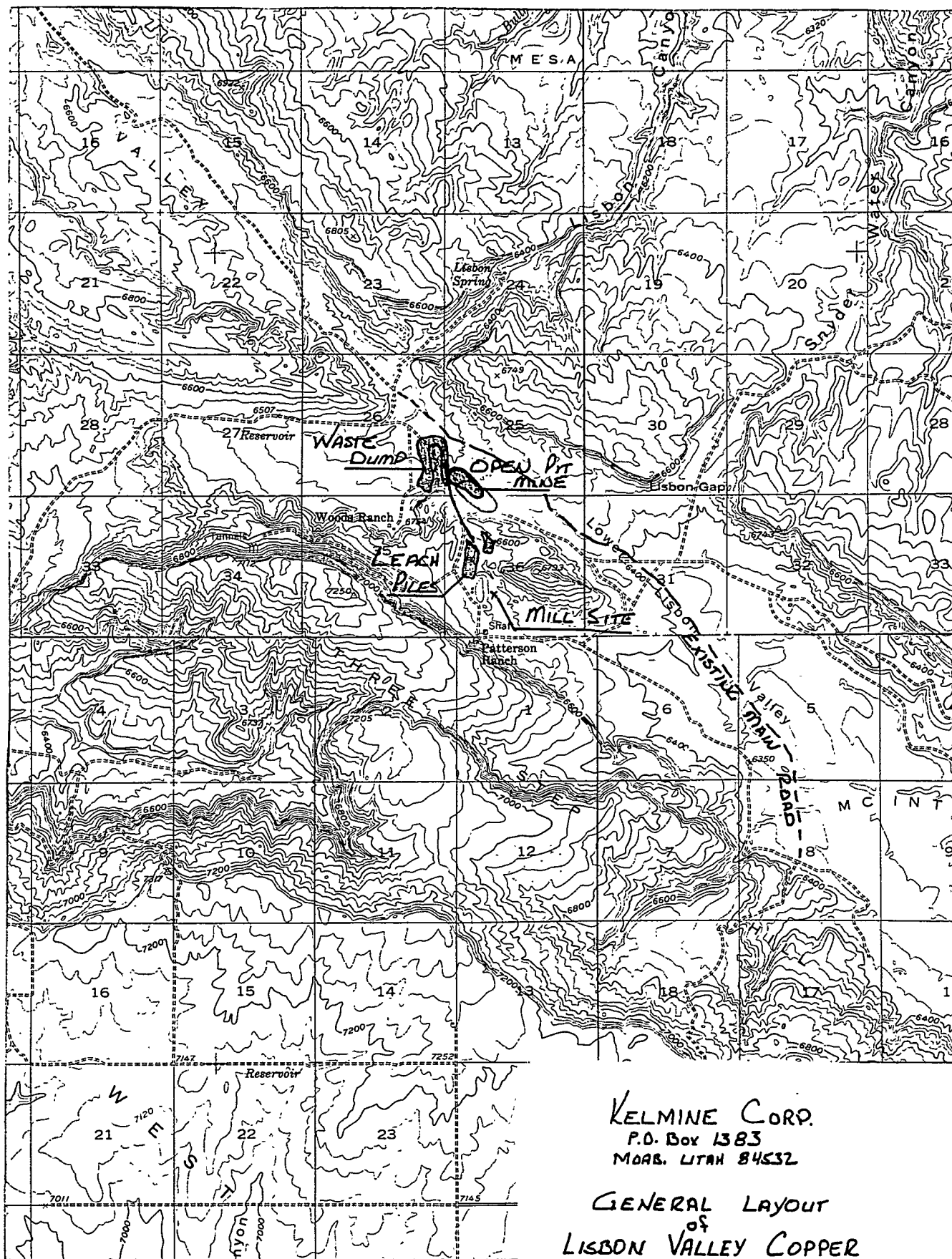
### MINE MAPS

1. Maps must be clear and legible contour maps or recent aerial photos. The scale should be 1 inch = 500 feet to adequately show topographic features.
2. Map sheets should be of a reasonable size, not to exceed 48 inches on a side.
3. Maps must have a title block with:
  - A. Map title.
  - B. Name and address of permittee.
  - C. Permit and amendment numbers.
  - D. Annual report period.
  - E. Scale, north arrow, contour interval, date of photography, etc.
4. All maps must show:
  - A. Legal subdivisions.
  - B. Permit area boundary clearly shown and labelled.
  - C. Amendment areas clearly shown and labelled.
  - D. Contour features.
5. The following features should all be clearly identified:
  - A. Topsoil stockpiles (numbered and with volumes).
  - B. Settling ponds and sediment control structures.
  - C. Haul roads.
  - D. Pits identified by location, name, number, etc.
  - E. Ramps (numbered).
  - F. Out-of-pit spoil dumps.
  - G. All waste disposal sites including, but not limited to:
    1. Landfill sites.
    2. Carbonaceous waste dumps.
  - H. Diversion ditches.
  - I. Monitoring sites.

14050



KELMINE CORP  
LISBON VALLEY COPPER  
Location map





# United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Moab District  
P. O. Box 970  
Moab, UT 84532

3400  
(U-065)

SEP 12 1985

Mel Swanson  
Kelmine Corporation  
P. O. Box 1383  
Moab, UT 84532

Dear Mr. Swanson:

The addresses of record of the two cases about which you inquired are as follows:

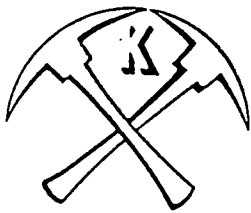
T. 30 S., R. 25 E., Sec. 25  
U-50038  
Pennzoil  
P. O. Box 1139  
Denver, CO 80201  
State Office is going to cancel lease.

T. 30 S., R. 25 E., Sec. 26  
U-012451  
Mesa Petroleum Co.  
P. O. Box 2009  
Amarillo, TX 79189  
Lease held by production.

Please submit your application to re-open the old Cub mines. Brent Northrup is the person to contact at this office for further information (259-6111). We will contact the Grand Resource Area office so that they will be aware of the proposed action.

cc: GRA (U-068)

*James J. Travis*



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 17, 1985

Mr. Max C. Wilcox  
P.O. Box 236  
La Sal, Utah 84530

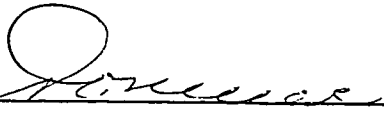
Dear Mr. Wilcox:

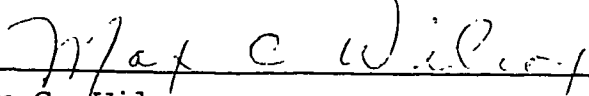
Re: G.P. 20253 - Utah State Grazing Lease

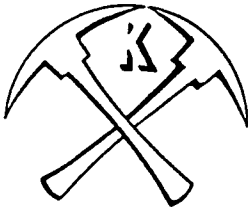
This letter will serve as a contract for Kelmine Corporation to use up to 50 acres of Section 36, T30S, R25E, SLBM for heap leach pads and mill processing sites for the purpose of processing copper ores. The processing plant and process ponds will be located on the previously deposited waste dump immediately southeast of the large dam constructed across the drainage on the northern half of the SW $\frac{1}{4}$  of Section 36. The leach piles will be formed on approximately five acre pads on the NW $\frac{1}{4}$  of Section 36. These pads will be reclaimed every four years or after the leaching of copper is completed. All traffic in this area will be kept on the west side of the leach pads so as to minimize disturbance of the remaining pasture. The process ponds and open liquor collection ponds will be fenced.

Payment for the usage of this pasture will be \$1,000.00 per year, payable in advance commencing annually upon the commencement of deposition of leach piles and/or leach tails on Section 36. Also as part of the payment, fresh water as available will be supplied at the mill site for livestock use at no charge. The annual payment and available water will continue until the pasture reclamation has been accepted by the Utah State Department of Natural Resources, Division of Oil, Gas and Mining.

Signed: \_\_\_\_\_

  
C. O. Keller, President/Chairman, Kelmine Corporation

  
Max C. Wilcox



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

Uranium King Corporation  
P.O. Box 1408  
Corrales, New Mexico 87048

Attention: Karl F. Meyars

Dear Sirs:

Re: Sec. 36, T30S, R25E, SLBM

Kelmine Corporation has sent a Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. The proposed project involves portions of T30S, R25E, Sections 25, 26, and 36, SLBM. The project proposes to open pit mine copper ores from the southwest corner of Section 25, to deposit waste on the southeast corner of Section 26 and to haul ores for heap leaching and processing at a site on the west half of Section 36. The open pit mine will disturb an area of approximately 10 acres within an area previously disturbed by mining. The waste dump will cover an area of approximately 40 acres of which 20 acres is covered by existing waste dump. The process area will be covered by approximately 45 acres of leach heaps and another five acres of process plants and holding ponds.

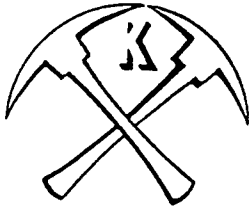
The project is designed to run 15.5 years after commencement. Within one year after completion, the waste dump, heap leach piles and mill sites will be reclaimed. No reclamation is planned for the open pit, but a fence will be erected to prevent entry.

Please address comments and questions to: Kelmine Corp.,  
P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

Mr. Max Wilcox  
Box 236  
La Sal, Utah 84530

Dear Sir:

Kelmine Corporation has sent a Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. The proposed project involves portions of T30S, R25E, Sections 25, 26, and 36, SLBM. The project proposes to open pit mine copper ores from the southwest corner of Section 25, to deposit waste on the southeast corner of Section 26 and to haul ores for heap leaching and processing at a site on the west half of Section 36. The open pit mine will disturb an area of approximately 10 acres within an area previously disturbed by mining. The waste dump will cover an area of approximately 40 acres of which 20 acres is covered by existing waste dump. The process area will be covered by approximately 45 acres of leach heaps and another five acres of process plants and holding ponds.

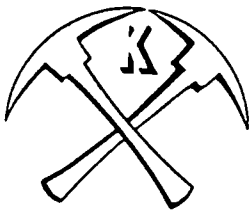
The project is designed to run 15.5 years after commencement. Within one year after completion, the waste dump, heap leach piles and mill sites will be reclaimed. No reclamation is planned for the open pit, but a fence will be erected to prevent entry.

Please address comments and questions to: Kelmine Corp.,  
P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

Mr. Ray Kunkel  
33 Holiday Haven  
Moab, Utah 84532

Dear Sir:

Kelmine Corporation has sent a Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. The proposed project involves portions of T30S, R25E, Sections 25, 26, and 36, SLBM. The project proposes to open pit mine copper ores from the southwest corner of Section 25, to deposit waste on the southeast corner of Section 26 and to haul ores for heap leaching and processing at a site on the west half of Section 36. The open pit mine will disturb an area of approximately 10 acres within an area previously disturbed by mining. The waste dump will cover an area of approximately 40 acres of which 20 acres is covered by existing waste dump. The process area will be covered by approximately 45 acres of leach heaps and another five acres of process plants and holding ponds.

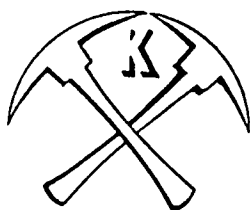
The project is designed to run 15.5 years after commencement. Within one year after completion, the waste dump, heap leach piles and mill sites will be reclaimed. No reclamation is planned for the open pit, but a fence will be erected to prevent entry.

Please address comments and questions to: Kelmine Corp.,  
P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

Mr. Joseph Costanza  
484 Sundial Drive  
Moab, Utah 84532

Dear Mr. Costanza:

Kelmine Corporation has sent a Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. The proposed project involves portions of T30S, R25E, Sections 25, 26, and 36, SLBM. The project proposes to open pit mine copper ores from the southwest corner of Section 25, to deposit waste on the southeast corner of Section 26 and to haul ores for heap leaching and processing at a site on the west half of Section 36. The open pit mine will disturb an area of approximately 10 acres within an area previously disturbed by mining. The waste dump will cover an area of approximately 40 acres of which 20 acres is covered by existing waste dump. The process area will be covered by approximately 45 acres of leach heaps and another five acres of process plants and holding ponds.

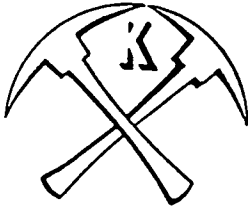
The project is designed to run 15.5 years after commencement. Within one year after completion, the waste dump, heap leach piles and mill sites will be reclaimed. No reclamation is planned for the open pit, but a fence will be erected to prevent entry.

Please address comments and questions to: Kelmine Corp.,  
P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

Mesa Petroleum Company  
P.O. Box 2009  
Amarillo, Texas 79189

Dear Sirs:

Re: Utah Lease No. U-012451

Kelmine Corporation has sent a Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. The proposed project involves portions of T30S, R25E, Sections 25, 26, and 36, SLBM. The project proposes to open pit mine copper ores from the southwest corner of Section 25, to deposit waste on the southeast corner of Section 26 and to haul ores for heap leaching and processing at a site on the west half of Section 36. The open pit mine will disturb an area of approximately 10 acres within an area previously disturbed by mining. The waste dump will cover an area of approximately 40 acres of which 20 acres is covered by existing waste dump. The process area will be covered by approximately 45 acres of leach heaps and another five acres of process plants and holding ponds.

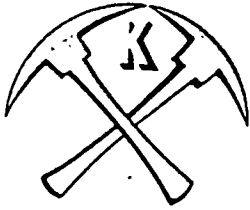
The project is designed to run 15.5 years after commencement. Within one year after completion, the waste dump, heap leach piles and mill sites will be reclaimed. No reclamation is planned for the open pit, but a fence will be erected to prevent entry.

Please address comments and questions to: Kelmine Corp., P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



# KELMINE CORP.

4901 YORK STREET • P.O. BOX 16043 • DENVER, COLORADO 80216 • PHONE 303/534-4102

September 16, 1985

State Director  
United States Dept. of the Interior  
Bureau of Land Management  
324 South State  
Suite 301  
Salt Lake City, Utah 84111-2303

Dear Sir:

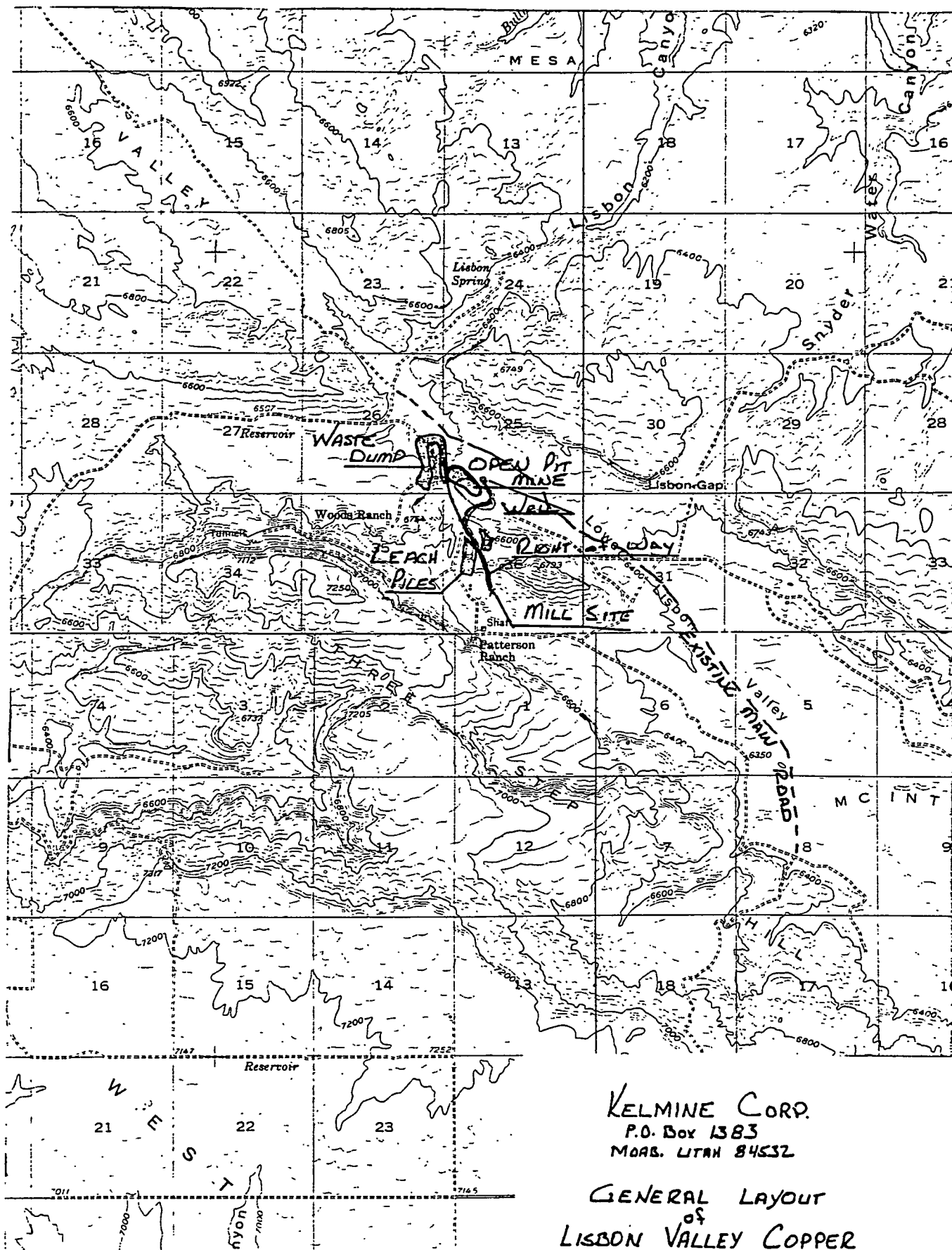
Application is hereby made for a pipeline right-of-way on BLM administered land to convey water from a well to a point of use. The well is located at Well No. 3 on approved appropriation application no. 43173 (05-962) which is located north 610 feet and 2980 feet east of the northwest corner at Section 36, T30S, R25E, SLBM. The point of use is a copper process mill located on the northeast  $\frac{1}{4}$  of the southwest  $\frac{1}{4}$  of Section 36, T30S, R25E. The right-of-way to follow existing roads and newly constructed roads are as outlined on the enclosed map.

Please address all correspondence to our office in Moab at P.O. Box 1383, Moab, Utah 84532.

Sincerely,

Melvin R. Swanson  
Manager

MRS/n  
Encls.



MINERALS LEASE

THIS LEASE made and effective as of the 15th day of February, 1985, between RAYMOND E. KUNKEL, of 33 Holliday Haven, Moab, Utah 84532, and PAUL B. CLEMONS, of 8604 East Devonshire, Scottsdale, Arizona 85251, (collectively the "LESSORS") and KELMINE CORP., a corporation, of 4901 York Street, P. O. Box 16043, Denver, Colorado 80216 ("LESSEE");

WITNESSETH:

I. RECITALS.

I.A. LESSORS are the Grantees in the following described Quit-Claim Deeds:

I.A.1. Quit-Claim Deed from G. M. Wallace & Co. dated September 30, 1976, which was recorded in the Recorder's Office of San Juan County, State of Utah (the "RECORDER'S OFFICE") on April 27, 1977, in Book 577 at Pages 391-398.

I.A.2. Quit-Claim Deed from Wallace Resources Inc. dated May 29, 1980, which was recorded in the RECORDER'S OFFICE on July 22, 1980 in Book 618 at page 891.

I.B. LESSORS believe, but do not warrant or represent, that under the foregoing deeds they have the right to mine and process the copper bearing ores down to a depth of 500 feet from the following:

I.B.1. The unpatented lode mining claims situated in San Juan County, State of Utah which are more particularly described in the copies of the notices of location and amended notices of location which are recorded in the RECORDER'S OFFICE, as follows:

<u>Name of Claim</u>	<u>Book</u>	<u>Page</u>
Camel	25	453
(amended)	231	261
Cow	25	454
(amended)	231	262
Cat	25	454
(amended)	231	262
Colt	25	455
(amended)	231	263

<u>Name of Claim</u>	<u>Book</u>	<u>Page</u>
Cougar	25	455
(amended)	231	263
Cub	25	456
(amended)	231	264
Coyote	25	456
(amended)	231	264
Sentinal 1	47	44
(amended)	231	256
Sentinal 2	47	45
(amended)	231	257
Sentinal 3	47	45
(amended)	231	257
Sentinal 4	47	46
(amended)	231	258
Sentinal 5	47	46
(amended)	231	258
Sentinal 6	47	47
(amended)	231	259
Sentinal 7	47	47
(amended)	231	259
Sentinal 8	47	48
(amended)	231	260
Sentinal 9	47	48
(amended)	231	260
Sentinal 10	47	49
(amended)	231	261
Security 3	377	402
Security 5	377	403
Security 7	377	404
Security 9	377	405
Security 11	377	406
Security 14	377	407
Security 15	377	408
Security 16	377	409
Security 18	377	410
Security 19	377	411
Security 20	377	412
Security 25	377	413
Security 26	377	414
Security 27	377	415
Security 28	377	416
Security 29	377	417
Security 30	377	418
Security 31	377	419
Security 32	377	420
Security 33	377	421
Security 34	377	422
Security 35	377	423
Security 36	377	424
Security 37	377	425
Security 38	377	426
Security 39	377	427
Security 40	377	428
Security 41	377	429
Security 42	377	430
Security 43	377	431
Security 44	377	432
Security 45	377	433
Security 46	377	434
Security 47	377	435
Security 48	377	436
Security 49	378	341
Security 50	378	342
Security 51	378	343
Security 52	378	344
Security 53	378	345

<u>Name of Claim</u>	<u>Book</u>	<u>Page</u>
Security 54	378	346
Security 55	378	347
Security 56	378	348

I.B.2. The State of Utah metalliferous lease Number 20569-described lands in San Juan County, State of Utah, to-wit:

Township 30 South, Range 25 East, SLM

Section 36: NW $\frac{1}{4}$ , E $\frac{1}{2}$

Containing 480 acres, more or less;

I.C. LESSORS believe, but do not warrant or represent, that under the foregoing deeds they have the right to mine and process the ores bearing copper and some other minerals from the following:

I.C.1. The unpatented lode mining claims situated in San Juan County, State of Utah which are more particularly described in the copies of the notices of location and amended notices of location which are recorded in the RECORDER'S OFFICE as follows:

<u>Name of Claim</u>	<u>Book</u>	<u>Page</u>
Climax No. 1	R-2	382
Climax No. 2	R-2	382
Alpha No. 1	63	96
(amended)	169	463
(amended)	270	83
Alpha No. 2	63	96
(amended)	169	463
(amended)	270	83
Alpha No. 3	63	97
(amended)	169	464
(amended)	270	84
Alpha No. 4	63	97
(amended)	169	464
(amended)	270	84
Alpha No. 5	63	98
(amended)	169	465
(amended)	270	85
Alpha No. 6	63	98
(amended)	169	465
(amended)	270	85
Alpha No. 7	63	99
(amended)	169	466
(amended)	270	86
Alpha No. 8	63	99
(amended)	169	466
(amended)	270	86
CW 1	510	62
CW 2	510	63
CW 3	510	64
CW 4	510	64

<u>Name of Claim</u>	<u>Book</u>	<u>Page</u>
CW 5	510	65
CW 6	510	67
CW 7	510	68
CW 8	510	69
CW 9	510	70
CW 10	510	71
CW 11	510	72
CW 12	510	73
CW 13	510	74
CW 14	510	75
CW 15	511	596
CW 16	511	597
CW 19	511	598
(amended)	521	8
CW 22	511	599
(amended)	521	9
KWR 1	487	130
KWR 2	487	131
KWR 3	487	132
KWR 4	487	133
KWR 5	487	134
KWR 6	487	135
KWR 7	487	136
KWR 8	487	137
KWR 9 Fraction	501	345
KWR 10	501	346
KWR Fraction	501	347
KWR 11 Fraction	521	469
KWR 12 Fraction	501	348
KWR 13 Fraction	501	349
CWG Fraction	517	275
CWG Fraction #1	517	276
CWG Fraction #2	517	277
CD 1	509	508
CD 2 Fraction	509	509
CD 3 Fraction	509	510
CD 4 Fraction	509	511
CD 5 Fraction	509	512
CD 6 Fraction	509	550
Globe #1	486	16
(amended)	489	392
Globe #2	486	17
(amended)	489	393
Globe #9	486	24
(amended)	489	400
Globe #10	486	25
(amended)	489	401

I.C.2. The following described fee land situated in San Juan County, State of Utah, to-wit:

Patterson Ranch

Township 31 South, Range 25 East, S.L.M.

Section 1: Lots 1, 2, 3 and 4

I.D. The interest of the LESSORS in the property described in Section I.B. and Section I.C. and the interest of the LESSORS in such water and water rights as are used

upon said property are collectively referred to hereinafter as the "LEASED PREMISES."

I.E. The rights of LESSORS as to some of the LEASED PREMISES are in the form of an ownership of the copper and some other minerals and in other parts of the LEASED PREMISES the rights are in the form of leases and subleases so that while this instrument is characterized as a "lease" it is a lease as to some portions of the LEASED PREMISES and a sublease as to the balance.

I.F. The LEASED PREMISES also include a mined stockpile of mixed oxide-sulphide copper ore estimated to contain 35,000 to 40,000 tons containing approximately 2% copper which is situated on the following described tract of land situated in San Juan County, State of Utah, to-wit:

Township 30 South, Range 25 East, S.L.M.

Section 36: SE $\frac{1}{4}$

I.G. The parties intend that any and all mining claims or other property acquired by LESSORS or LESSEE within one (1) mile of any part of the LEASED PREMISES shall be deemed to be part of the LEASED PREMISES and subject to this MINERALS LEASE.

I.H. This MINERALS LEASE is conditioned upon the LESSEE being able to purchase the SX-EW and installing and making the same operational as part of a plant on the LEASED PREMISES within nine (9) months after state and federal approval of mining and operating plans and LESSEE is willing to make a reasonable effort to secure that approval.

I.I. Subject to the condition set forth in Section I.H. the LESSORS desire to lease to the LESSEE and the LESSEE desires to lease the LEASED PREMISES from the LESSORS.

## II. LEASE

II.A. For and in consideration of the mutual covenants and agreements hereinafter set forth, and for

other good and valuable consideration received by LESSORS from LESSEE, LESSOR does hereby lease, let and demise exclusively to LESSEE all of the right, title and interest of the LESSORS in and LESSORS hereby grant exclusively to LESSEE any and all rights of LESSORS to occupy, use, enjoy and possess the LEASED PREMISES, including, but not limited to, the following:

II.A.1. To explore for minerals.

II.A.2. To mine or otherwise extract, to mill, treat or otherwise process, and to store, stockpile, remove, market, sell or otherwise dispose of ore and minerals.

II.A.3. To dispose of or deposit waste material and tailings on the LEASED PREMISES.

II.A.4. To construct, use, maintain, repair, replace and relocate in or upon the LEASED PREMISES buildings, shops, plants, machinery, mills, facilities, ore bins and structures of all kinds, roads, shafts, inclines, tunnels, drifts, open pits, pipelines, telephone lines, electric transmission lines and transportation facilities and other utilities.

II.A.5. To use any underground water now existing or subsequently discovered or developed in or upon the LEASED PREMISES.

II.A.6. To exercise any and all other rights and privileges which are incidental to or which may be useful, desirable or convenient in LESSEE'S exercise of any or all of the rights hereinabove specified which are not in conflict with applicable state and federal laws and regulations.

II.A.7. LESSEE may use and enjoy the LEASED PREMISES and exercise any of the rights granted hereunder by any methods now or heretofore known or hereafter developed.

II.B. The LEASED PREMISES include any and all mining claims or other property acquired by LESSORS or LESSEE within one (1) mile of any part of the LEASED PREMISES

amendment or modification of this MINERALS LEASE shall become effective unless and until the same shall have been reduced to writing and duly signed, executed and acknowledged by the parties hereto.

II.X. This MINERALS LEASE may be executed in counterpart.

IN WITNESS WHEREOF, the parties hereto have executed this Lease as of the day and year first written above.

LESSORS

Raymond E. Kunkel  
Raymond E. Kunkel

Paul B. Clemons  
Paul B. Clemons

LESSEE

KELMINE CORP.

By C. O. Keller  
C. O. Keller, President

STATE OF Utah )  
County of Grand ) ss.

On this 13th day of February, 1985, personally appeared before me Raymond E. Kunkel, one of the signers of the foregoing Minerals Lease, who duly acknowledged to me that he executed the same.

Patricia H. Holzapfel  
Notary Public

Residing at Moab, Utah

My Commission Expires: 3/28/88

STATE OF Arizona )  
County of Maricopa ) ss.

On this 18th day of February, 1985, personally appeared before me Paul B. Clemons, one of the

## 15. A(2) Mining Sequence

The mining and milling sequence is made up of two phases. Phase I will deal with the predominantly copper oxide ore, and Phase II will involve the mining and leaching of mixed oxide-chalcocite ore.

Phase I mining involves the existing disturbed surface north of the present pit. The present pit will be expanded by 10 acres on this north side and mined to a depth of 100 feet (see sections in Pocket B). This mining will be performed by the open pit method using crawler tractors to rip the rock, then load it into 35 ton trucks to haul to the process facility. Mining will be done during day shift only at the rate of 500 tons per day, 350 days per year. The economic aggregate pit slope will average 1.5 to 1.0 on this north side. The current slope is 1.0:1.0 and has been standing unattended at this angle for over 12 years without collapsing. So it is felt that the flatter 1.5:1.0 slope should be safe to work around.

Phase I ore reserves total 357,000 tons, sufficient for two years of operation. The processed ore, tails, will cover an area of 5.2 acres, 40 feet high, in the disposal area with a slope of 2:1. The associated waste stripped during Phase I will total 720,000 tons. This material will be deposited west of the pit on top of the preexisting waste dump to an elevation of 6480 feet. The finished slopes will be 2:1 except on the southwest corner where the existing dump joins the existing Cub Mine dump. This waste will cover an area of 19.6 acres. (See Pocket A for Plan.)

Phase II mining will again be by open pit methods, but involve deepening of the new and existing pit limits. The pit will be deepened to an elevation of 6275 feet or approximately 65 feet below the present bottom. The north slope will be maintained at an average pitch of 1.5 to 1.0 with a minimum 50 foot wide safety bench at 100 vertical feet below the surface. The ore and waste will be removed to the maximum width before the depth is lowered. This will facilitate the use of crawler/rippers to break the rock. The south slope is presently standing at an angle slightly steeper than 1.0 to 1.0. This wall is geologically stable in that it has been standing at this slope for 12 years with no failure. It is planned to continue this wall down 65 vertical feet at a 1.0 to 1.0 slope. It is felt that since the pit access road is located on the flatter north side safety to personnel and equipment has been provided for.

Phase II ore will be hauled to lined leach pads and stacked in three ten foot high lifts for leaching. The ore reserves for Phase II total 1.18 million tons, and when deposited on four leach pads in three ten foot high lifts will cover an approximate area of 20 acres.

The associated waste rock will total 2.0 million tons which will be deposited on 16.8 acres of undisturbed land adjacent to and north of the existing dump just west of the pit. The height of this new dump will be 90 feet and built to an elevation of 6480 feet. The slopes will be constructed to an angle of 2:1. The EPA toxicity tests show the waste to be below toxic standards so no waste dump liners are provided for. (See Plan in Pocket A)

At the proposed annual mining rate of 175,000 tons per year, the Phase II reserves will last 7 years.

For the mill process description, see the attached Hazen Research, Inc. Report page 35.



**Hazen Research, Inc.**  
4601 Indiana St. • Golden, Colo. 80403  
Tel: (303) 279-4501 • Telex 45-860

September 19, 1985

Mr. Mel Swanson  
Kelmine Corp.  
P.O. Box 1383  
Moab, Utah 84532

Re: HRI Project 6084  
Processing Copper Ore - Lisbon Valley Project

Dear Mr. Swanson:

In accordance with your recent request, we have prepared various information required by the State of Utah concerning processing of copper ores from your Lisbon Valley mine.

#### **Process Description**

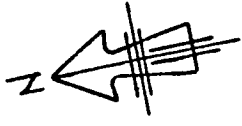
The processing facilities will be designed to treat up to 175,000 tons per year of copper ore. The process facilities will consist of two sections: (1) ore preparation and leaching, and (2) solution treatment and finished product. Figures 1 and 2 show the site plan for each facility.

##### **1. Ore preparation and leaching**

The mine-run ore will be stored in an open, working stockpile covering an area approximately 100 ft x 100 ft in size. The ore will be kept moist to control dusting. Ore from the stockpile will be dumped by front-end loader into a hopper and conveyed to a rotary drum. In the rotary drum, approximately 6 gallons of solution per ton of ore will be sprayed on the ore. The solution will contain about 25% sulfuric acid by weight.

The ore, discharged from the rotary drum, will contain approximately 11 to 12% moisture. No dust will be generated in the rotary drum. The ore will be transported by conveyor to a 100-ton storage bin. Approximately 19 gallons of solution per ton of ore will be added to the ore on the conveyor. The solution will contain 0.05% by weight of polyacrilimide type flocculant.

The ore from the bin will be transported by truck to a concrete leach pad approximately 51,000 ft<sup>2</sup> in size. Figure 3 shows a conceptual design of the leach pad.



KELMINE CORPORATION  
 ORE PREPARATION AND LEACHING PROCESS SITE  
 SAN JUAN COUNTY, UTAH

APPROX. DISTURBED AREA	
ORE STOCKPILE	= 10,000 Ft. <sup>2</sup>
FEEDER SLAB	= 245 Ft. <sup>2</sup>
SLAB FOR TANKS	= 1,600 Ft. <sup>2</sup>
ORE BIN	= 155 Ft. <sup>2</sup>
CONCRETE LEACH PAD	= 51,200 Ft. <sup>2</sup>
TOTAL	= 63,200 Ft. <sup>2</sup>

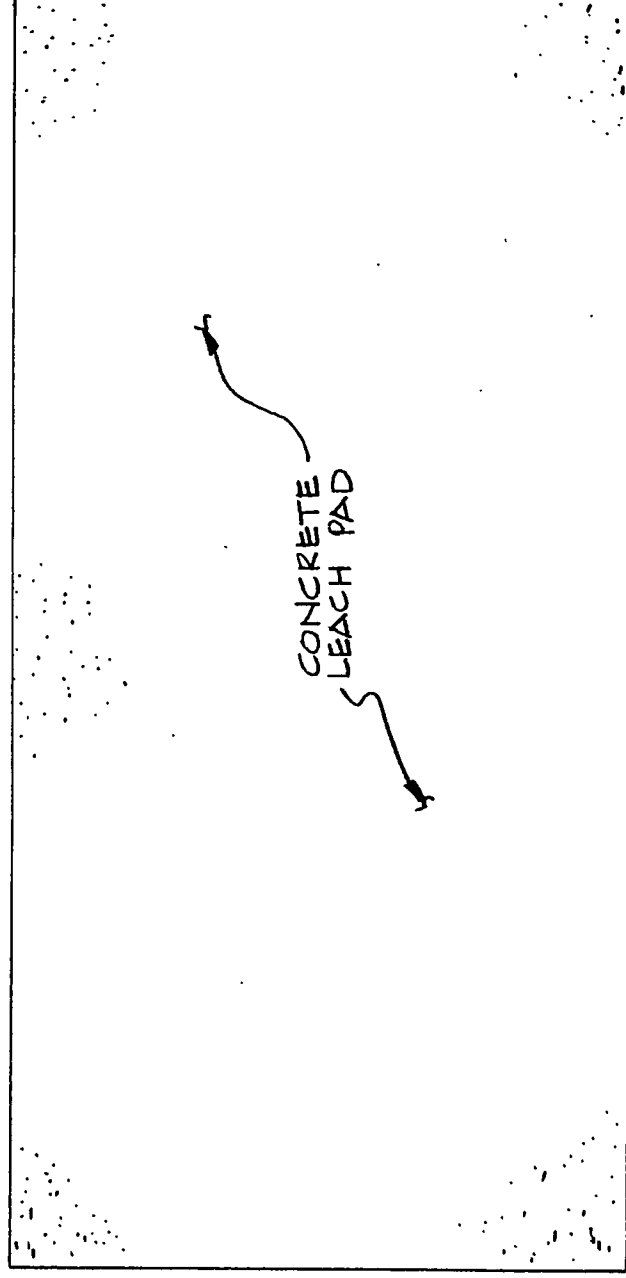
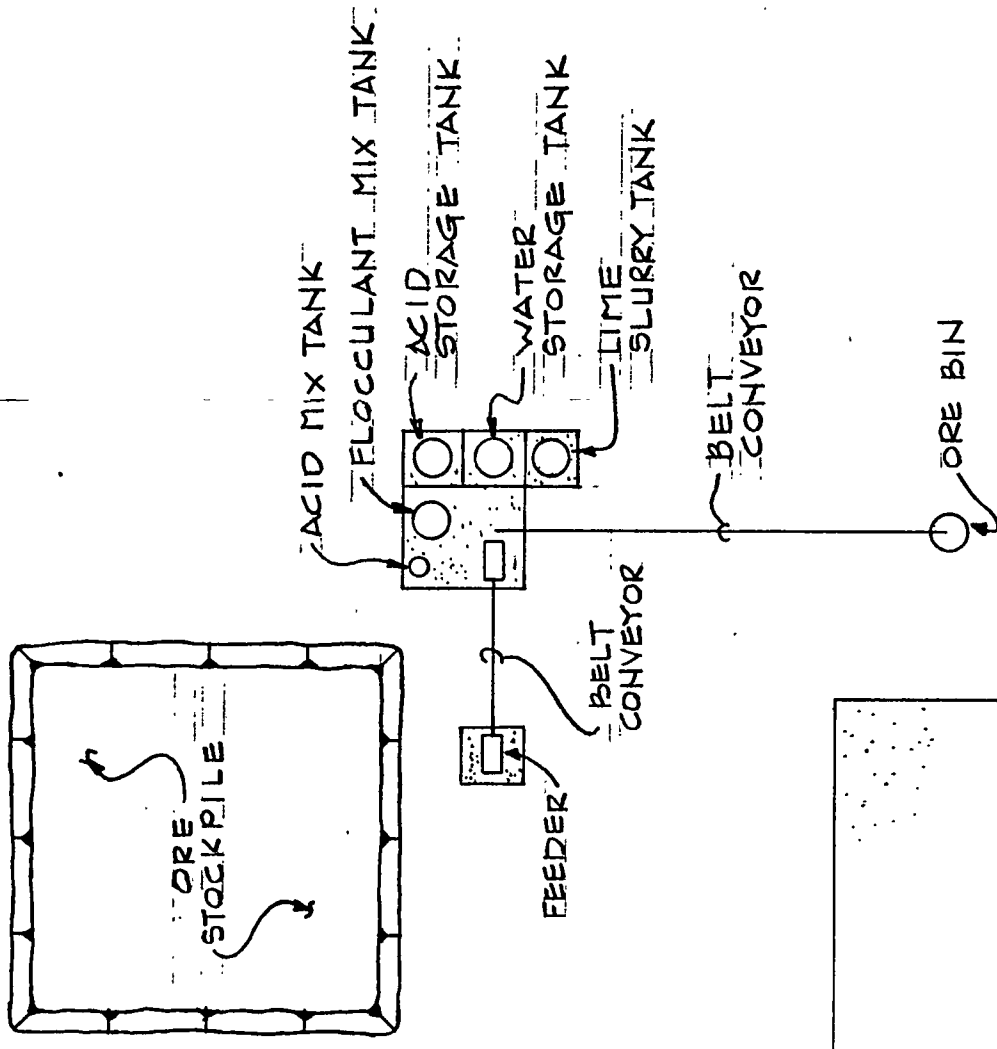
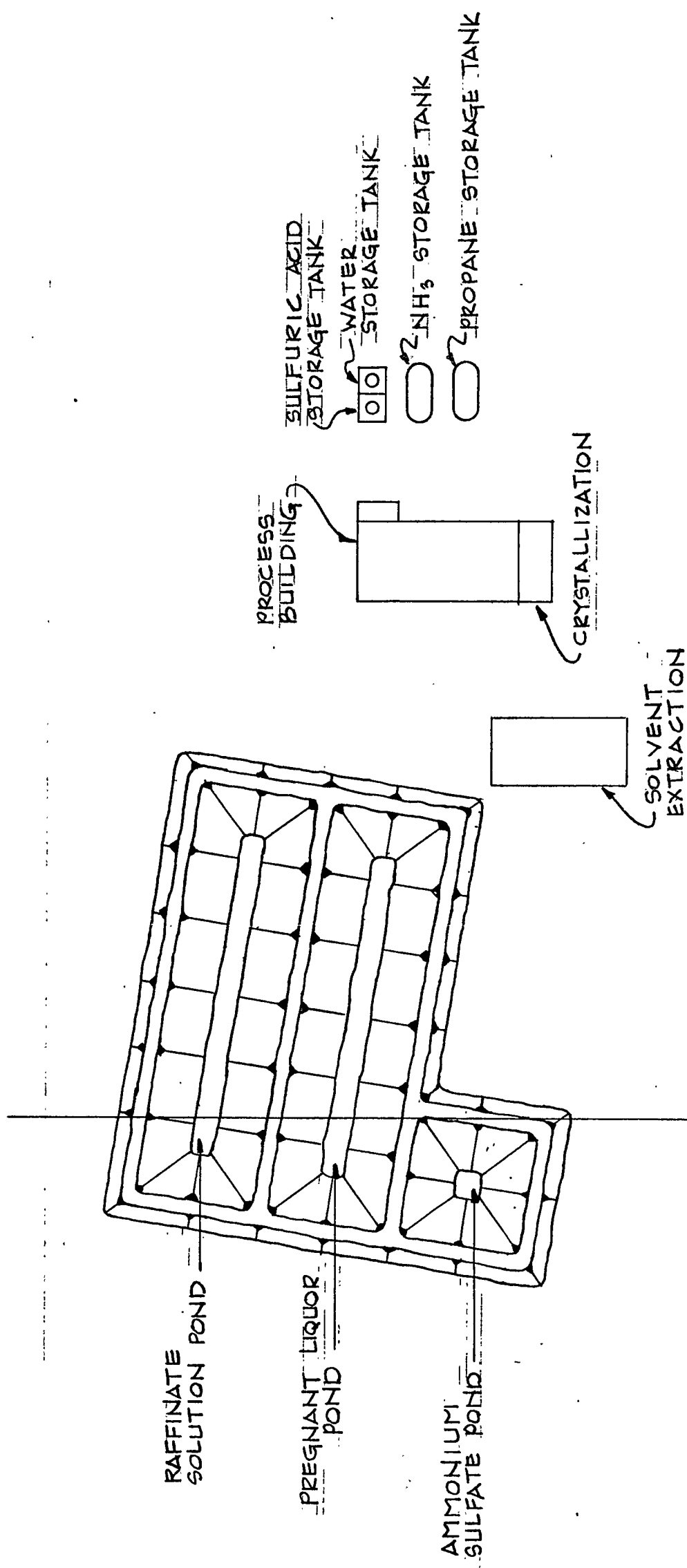


FIGURE 1



KELMINE CORPORATION  
SOLUTION TREATMENT AND FINISHED PRODUCT PROCESS SITE  
SAN JUAN COUNTY, UTAH



APPROX. AREA - PLANT SITE  
= 400,000  $\text{Ft}^2$   
= 9 ACRES



CN 36,000

FIGURE 2



KELMINE CORPORATION  
CONCEPTUAL DESIGN OF CONCRETE LEACH PAD  
SAN JUAN COUNTY, UTAH

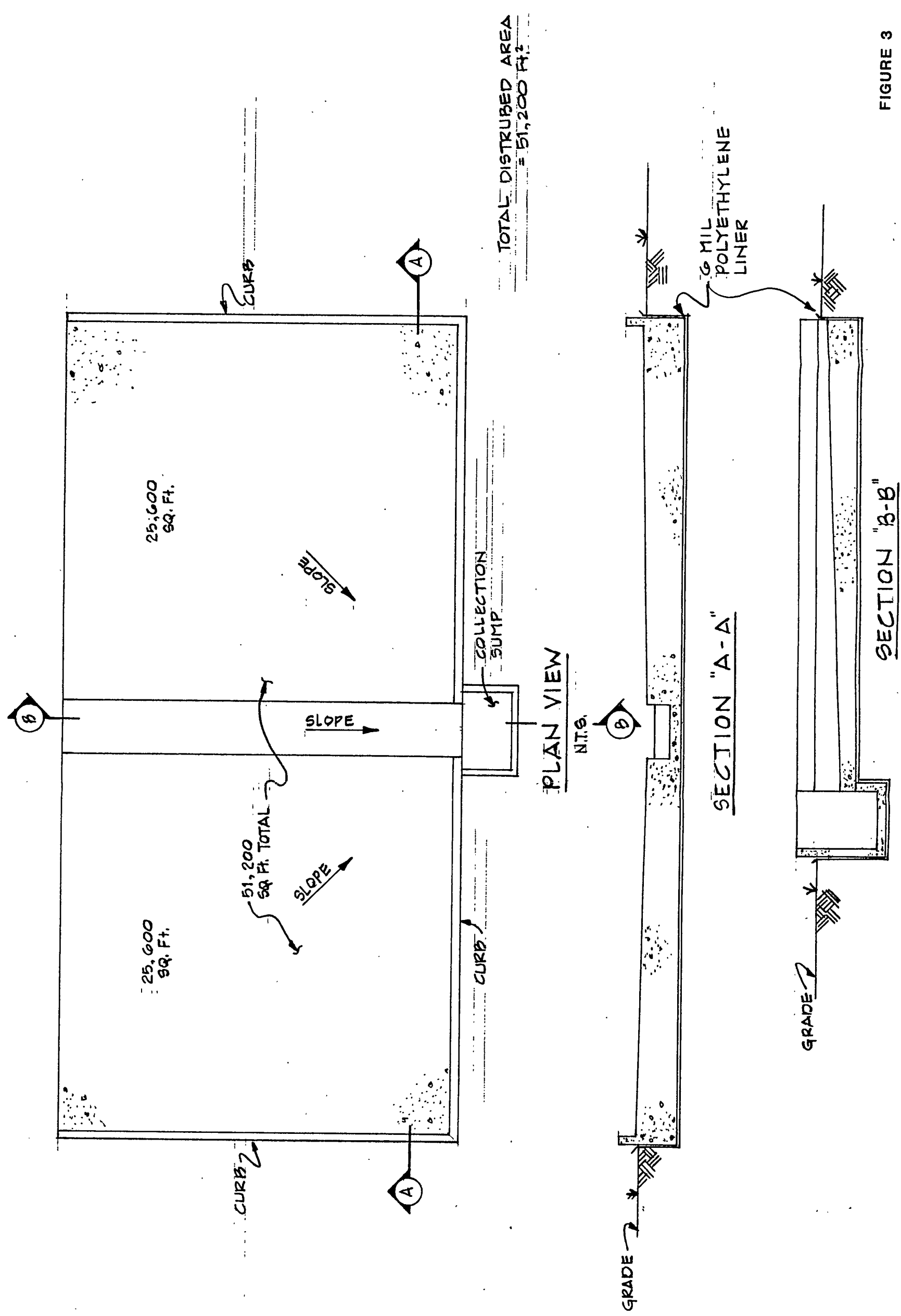


FIGURE 3

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September 19, 1985

The leach pad will have two sections available for heap leaching ore. Each section will have the capacity for a 7500 ton ore heap seven to eight feet high. After a section is loaded with ore, raffinate solutions from the solvent extraction circuit (described later in this letter) will be sprinkled on the heap and percolated through the heap at a rate of up to 95 gpm for leaching of the copper. The leach solution to the ore heap will have a pH of 2.0 to 2.5. Leaching of the ore will continue for up to 15 days. The initial pregnant leach liquor discharged from the ore heap will contain up to 40 gpl of copper, 17 gpl iron, 3 gpl aluminum, and 1.5 gpl free sulfuric acid with pH of 1.5 to 2.0. After about the third day of leaching, the pregnant liquor will contain approximately 1 gpl copper, 2.0 gpl iron, 0.5 gpl aluminum, 0.4 gpl free sulfuric acid with pH of 2.0 to 2.5.

During the 15-day leaching cycle, the pregnant liquor will be pumped to a lined pond with a capacity of 1.1 MM gallons. The design of the pond will be described later in this letter. Leaching operations will be conducted seven days per week, 24 hours per day.

Two types of copper ore will be leached, one containing a high percentage of copper oxide minerals, and the other containing significant quantities of copper sulfide minerals. The two types of ore will be mined and processed separately.

With regard to the oxide ore, leaching of the copper will be completed within the 15-day leaching period. After leaching is completed, the ore heap will be allowed to drain, and a milk-of-lime solution will be percolated through the ore heap to neutralize residual sulfuric acid in the heap. After neutralization, the pH of the heap will be 7 to 8.

The leach tails from copper oxide ore will be removed from the concrete leach pad with a front-end loader and conveyed to an unlined area for tailings disposal. The tailings pile will cover approximately 5.3 acres with 40 ft of height.

During the 15-day leaching cycle, the other section of the leach pad will be loaded with approximately 7500 tons of ore in preparation for the next 15-day leach cycle.

With regard to the sulfide ore, the copper will not be leached completely within the 15-day leach period. After the 15-day leach cycle, the partially leached ore will be allowed to drain, removed from the leach pad with a front-end loader,

Mr. Mel Swanson  
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and conveyed to a lined area for additional heap leaching. Figure 4 shows the proposed design for the lined heap leach area. The ore will be piled up to 30 ft high for additional leaching. Raffinate solution from the solvent extraction circuit with a pH of 2.0 to 2.5 will be sprinkled on the heap, percolated through the heap for leaching of copper. The rate of addition of the leaching solution to the heap will be approximately five gallons of solution per day per square foot of ore area. Additional leaching of the ore will continue for up to one year's time (operating seven days per week, 24 hours per day) depending on the rate of copper leaching.

The pregnant liquor discharging from the heap will be recirculated on the heap until the copper content is approximately 6 gpl. When this copper concentration is reached, the pregnant liquor will be pumped to the previously mentioned pregnant liquor storage pond.

After leaching of copper is completed, the heap will be drained, and a milk-of-lime solution will be percolated through the heap to neutralize residual sulfuric acid in the heap.

If the leak detection system installed below the lined heap pads indicates that the liner is leaking leach solution, leaching will be terminated and the heap will be abandoned.

Pilot plant scale leaching tests on both copper oxide and sulfide ores show that the pregnant leach liquors from both ores contain the following maximum analyses:

Bi	0.002 gpl
Sb	0.002 gpl
Ni	0.003 gpl
Cl	0.004 gpl
Pb	0.001 gpl
As	0.001 ppm
Hg	0.0001 ppm

## 2. Solution treatment and finished product

The pregnant liquor from all heap leach operations will be stored in a lined and fenced pond with a working capacity of 1.1 MM gallons with 10 feet of solution depth. Pond freeboard will be 2.5 ft. The proposed design of the pond

KELMINE CORPORATION  
 CONCEPTUAL SECTION THRU COPPER SULFIDE ORE HEAP LEACH PAD  
 SAN JUAN COUNTY, UTAH

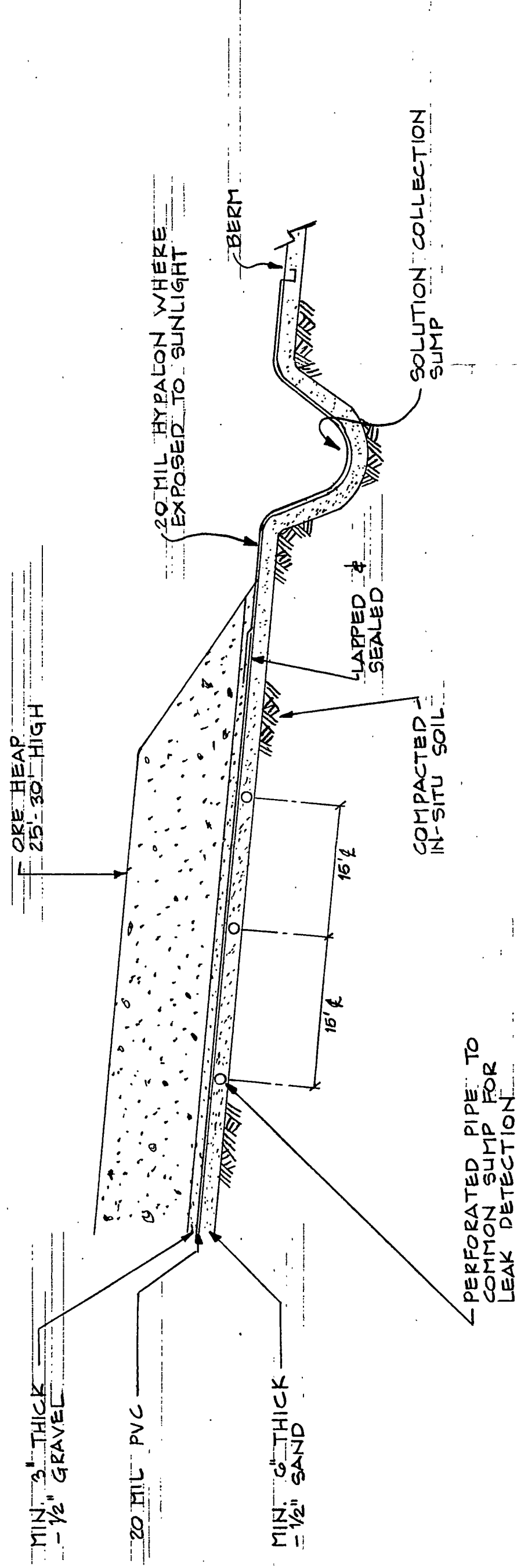


FIGURE 4

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is shown in Figure 5. The pregnant liquor will be heated to 85°F and will contain up to 7 gpl copper, 0.7 gpl iron, 0.4 gpl aluminum, and 0.4 gpl free sulfuric acid with a pH of 2.0 to 2.5. All elements will be in solution as soluble sulfates.

Pregnant liquor will be processed in a solvent extraction circuit at the rate of up to 100 gpm. Copper will be extracted by a dodecylsalicylaldoxime solvent mixed with kerosene, and stripped from the solvent reagent with a strong sulfuric acid solution. The product strip solution will contain up to 60 gpl copper and a small amount of iron.

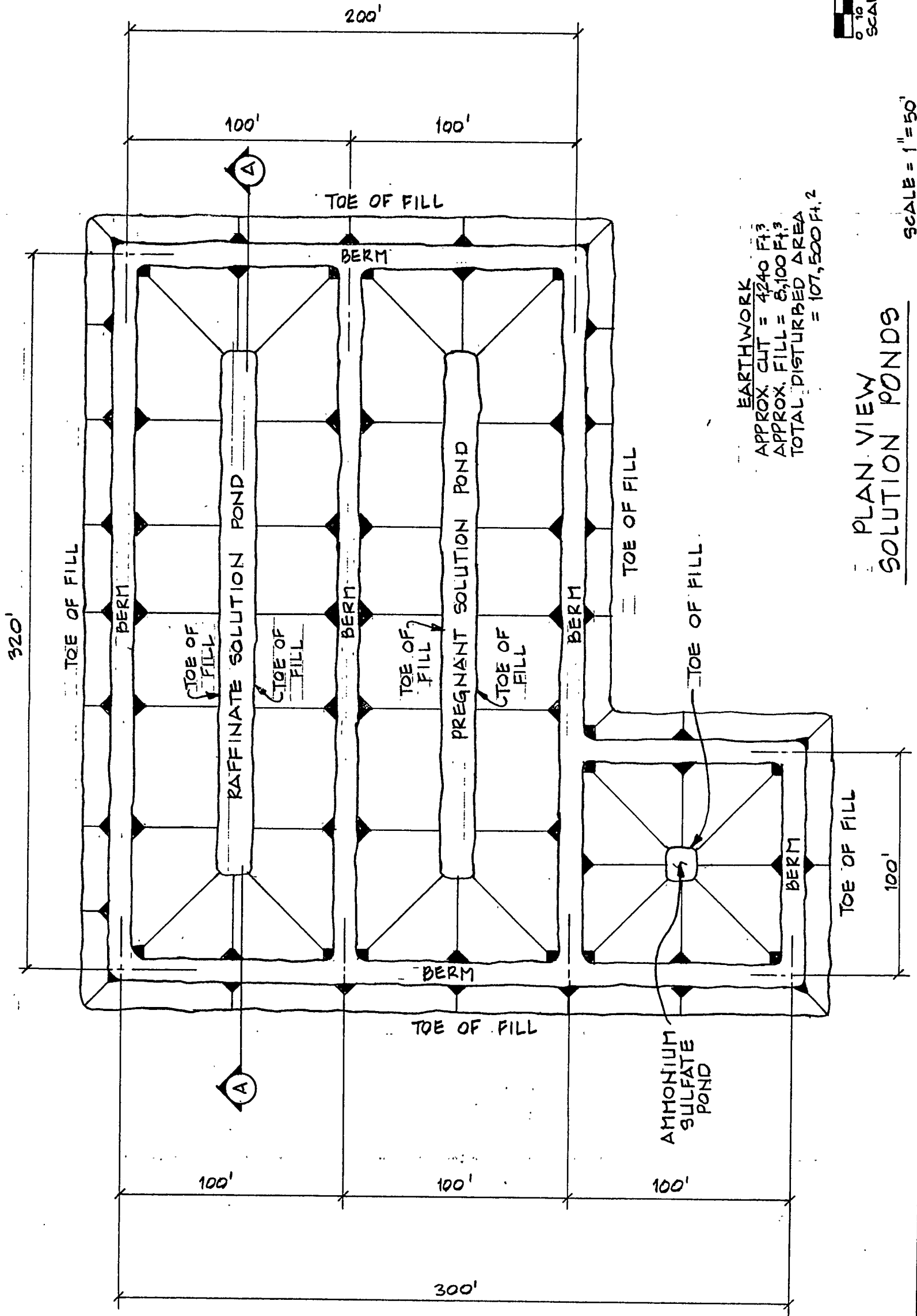
The strip solution will be cooled, sulfuric acid added to the solution, and copper sulfate crystals will be produced. The copper sulfate crystals will be filtered and the filtrate recycled to solvent extraction as strip solution for stripping copper from the solvent.

The raffinate, discharged from the solvent extraction circuit will contain less than 1 gpl copper, and about 0.6 gpl iron, and 0.4 gpl aluminum, with a pH of 1.5 to 3.0. This solution will be pumped to a lined and fenced pond, which will have the same capacity and design (see Figure 5) as the previously described pond for pregnant liquor. The pH of the raffinate will be adjusted with ammonia gas or sulfuric acid to a pH of 2.0 to 2.5, if necessary, and the raffinate recycled to the ore heaps as leaching solution for copper.

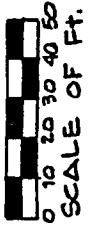
The copper sulfate crystals will be dissolved in water, ammonia gas added to a pH of 7.5 and the solution heated to about 160°F. A copper hydroxide-sulfate product, containing 53% copper, is precipitated. The precipitated product will be filtered, dried, and packaged in up to 50 lb bags for market. Any dust generated from product drying or packaging will be collected and recovered in a bag house dust collection system. The filtrate, containing about 80 gpl of ammonium sulfate will be pumped to a lined and fenced pond with a working capacity of 200,000 gallons with 10 ft of solution depth. The proposed design of the pond is the same as the pregnant liquor pond shown in Figure 5. The ammonium sulfate solution will be periodically pumped to the raffinate pond, recycled to solvent stripping, or diluted with water and used to fertilize leached ore tails for reclamation.

When 175,000 tons per year of ore are processed, approximately 2500 tons per year of finished product will be produced.

KELMINE CORPORATION  
CONCEPTUAL PLAN OF SOLUTION PONDS  
SAN JUAN COUNTY, UTAH



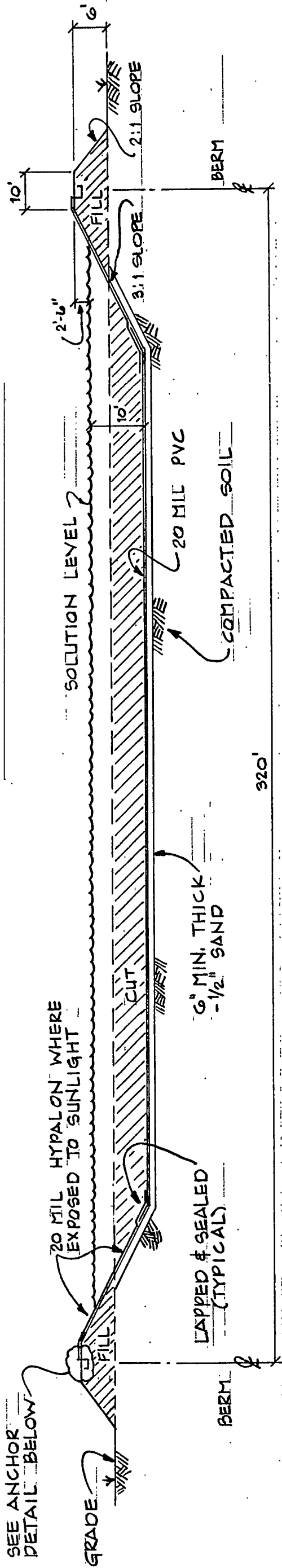
EARTHWORK  
APPROX. CUT = 4240 Ft.<sup>3</sup>  
APPROX. FILL = 8,100 Ft.<sup>3</sup>  
TOTAL DISTURBED AREA  
= 107,500 Ft.<sup>2</sup>



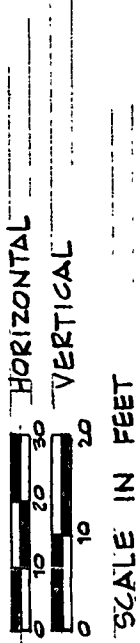
PLAN VIEW  
SOLUTION PONDS

SCALE = 1" = 50'

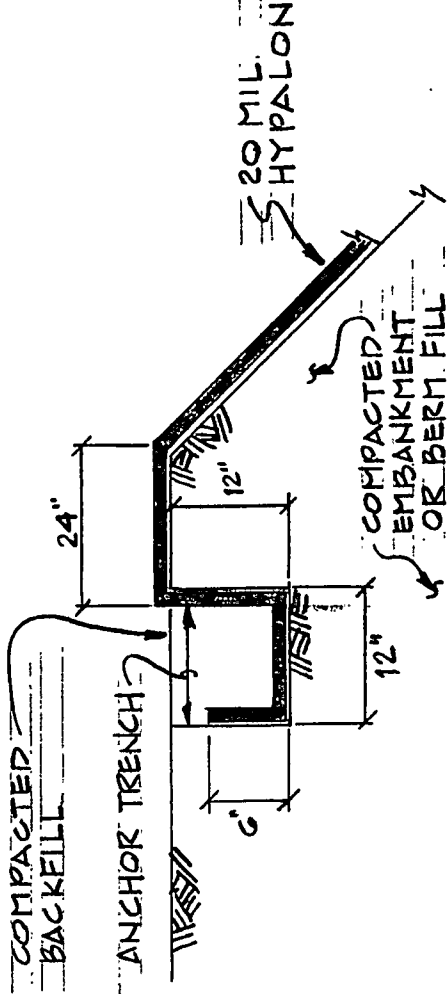
KELMINE CORPORATION  
 CONCEPTUAL SECTION THRU SOLUTION PONDS  
 SAN JUAN COUNTY, UTAH



ELEVATION "A-A"



SCALE IN FEET



ANCHOR DETAIL

N.T.S.

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September 19, 1985

The solution treatment and finished product operations will be conducted up to seven days per week, 24 hours per day.

A propane-fired steam boiler will provide process heat for solvent extraction and precipitation of copper product, and heat for the process building. The total heat requirements will be less than 5.0 MM Btu's per hour.

### Soil Tests

Various tests were made on representative soil samples taken from the proposed location of (1) the concrete leach pad, lined heap leach pads, and the area for leached tails from oxide ore, and (2) the pregnant liquor, solvent extraction raffinate, and ammonium sulfate solution storage ponds.

Following are the results of the soil tests:

1. Soil under concrete leach pad, lined ore heaps, and leach oxide tails area.  
pH - 8.6  
Permeability of compacted soil -  $10^{-9}$  cm/sec  
Equivalent acid consumption - 130 lb 100% sulfuric acid/ton of dry solids
2. Soil under solution storage ponds - Brushy Basin Shale (Jmb)  
pH - 7.4  
Permeability of compacted soil -  $10^{-2}$  cm/sec.  
Equivalent acid consumption - 26 lb 100% sulfuric acid/ton of dry solids

The test for pH of the soils was performed in accordance with the procedure shown in the U.S. Department of Agriculture, Soil Survey Manual, No. 18.

It should be noted that the soil in the area of the concrete leach pad, lined ore heap, and the leach oxide ore tails is a very high acid consumer (130 lb acid/T). Thus, if any leakage of solution should occur during leaching, the acid would be quickly neutralized and the copper, iron, and aluminum would be rapidly precipitated after neutralization of the acid.

The soil in the area of the concrete leach pad and lined ore heaps has a very low permeability ( $10^{-9}$ ) whereas, the soil in the area of the solution storage ponds has higher permeability ( $10^{-2}$ ). It is proposed that soil with the low permeability be

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transported and blended with the higher permeability soil under the solution storage ponds so that the finished compacted soil under the solution ponds has a permeability of less than  $10^{-6}$ .

### Reclamation

EPA toxicity tests were performed on leached tails from both copper oxide and sulfide ores. The results are as follows:

Element	Analysis (ppm)	
	Oxide Ore	Sulfide Ore
As	< 0.001	0.002
Ba	0.85	0.91
Cd	0.003	0.004
Cr	< 0.01	< 0.01
Pb	0.22	0.35
Hg	< 0.0001	< 0.0001
Se	< 0.001	0.001
Ag	< 0.01	< 0.01

With regard to fertilization of the ore for reclamation, approximately 20 lb of ammonium sulfate per ton of leached tails will be available, as required from the precipitation of finished product, for fertilizing tailings for reclamation. The ammonium sulfate will be available as a solution, which can be adjusted to the desired concentration of ammonium sulfate.

### Flowsheet and Material Balance

A process flowsheet with material balances for treating 175,000 tons of ore per year is shown in Figure 6.

KELMINE CORPORATION  
LISBON VALLEY COPPER PLANT PROCESS FLOW SHEET AND MATERIAL BALANCE  
SAN JUAN COUNTY, UTAH  
(ALL NUMBERS ARE TONS PER YEAR)

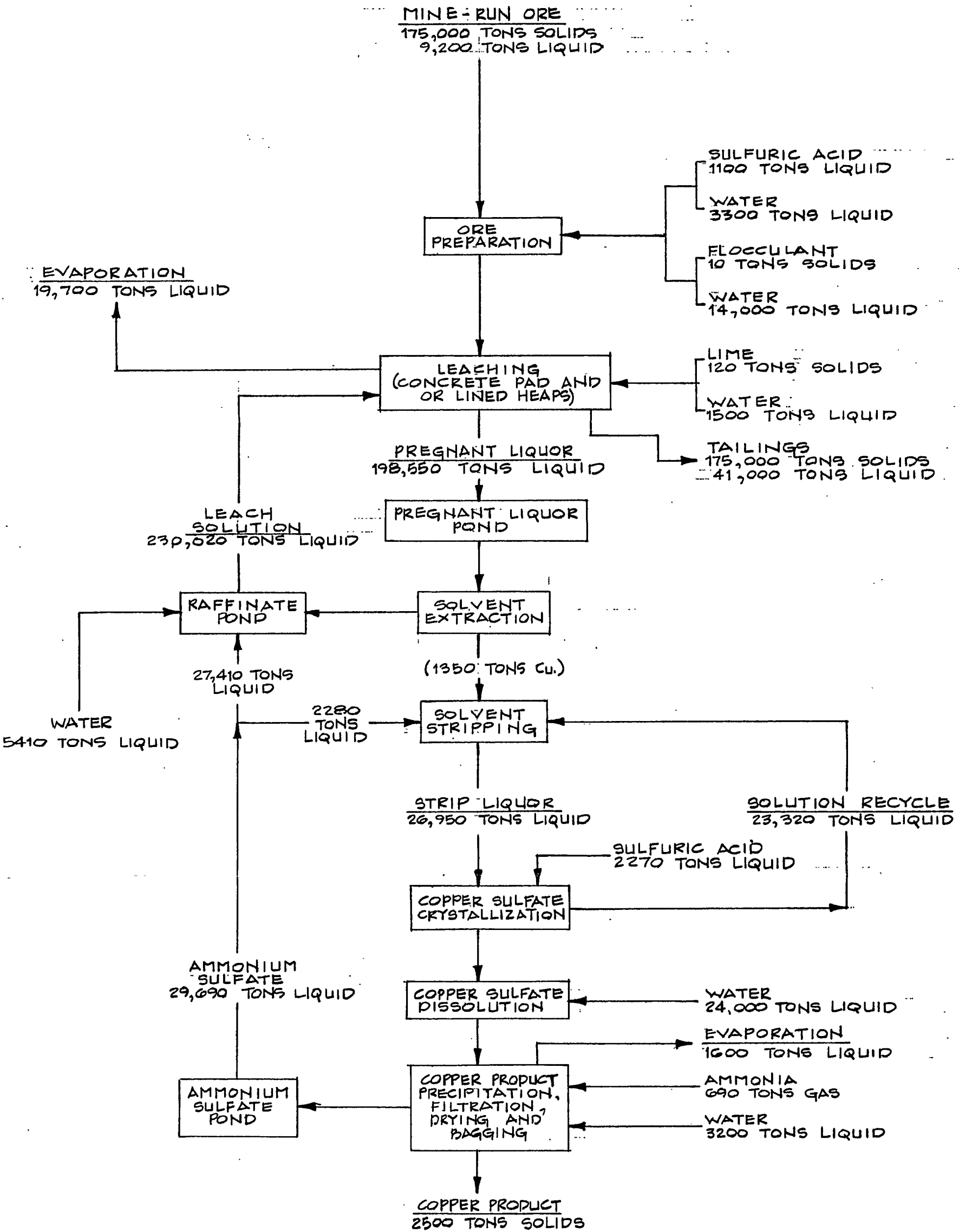


FIGURE 6

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September 19, 1985

The following materials will be fed to the process:

Item	Tons/year
Ore (dry)	175,000
Water in ore	9,200
Sulfuric acid (93%)	3,370
Ammonia	690
Flocculant	10
Lime	120
Fresh water	<u>51,410</u>
Total	239,800

The following materials will be discharged from the process:

Item	Tons/year
Tailings (dry)	175,000
Water in tailings	41,000
Water evaporated	21,300
Copper product	<u>2,500</u>
Total	239,800

The fresh water requirements will vary between 25 and 50 gpm depending upon the seasonal water evaporation rates.

### **Chemical Reagents**

The chemicals listed in Table 1 will be used as reagents in the extraction process. The on-site reagent system will be designed for a minimum of ten days storage. All chemicals and materials storage and handling facilities will be designed to comply with Department of Transportation, OSHA, and MSHA regulations and will follow guidelines set forth in manuals provided by the Manufacturing Chemists Association and the National Tank Truck Carriers, Inc. Employees handling these items will be given training in safe handling of all materials

Mr. Mel Swanson  
September 19, 1985

Table 1

Kelmine Corporation  
Chemical Reagents  
Lisbon Valley Copper Plant

Reagent	Annual Consumption <sup>1/</sup>	Shipping Method	Storage	Necessary Mitigating Procedures	Airborne Emissions
Sulfuric acid (93%)	3370 tons	Tank truck 89 loads/yr	Steel tank	None	None
Anhydrous ammonia	690 tons	Tank truck 29 loads/yr	Steel tank	None	Minor amount vented when making or breaking connections with tank
Flocculant	10 tons	Van truck 10 loads/yr	55-gal drums	None	None
Solvent	1000 gals	Van truck 3 loads/yr	55-gal drums	None	None
Kerosene	4000 gals	Van truck 6 loads/yr	55-gal drums	None	None
Lime	120 tons	Flat-bed truck 6 loads/yr	Bags	None	None
Propane	400,000 gals	Tank truck 70 loads/yr	Steel tank	None	Minor amount vented when loading tank

1/ Based on 175,000 tons of ore processed per year.

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September 19, 1985

The sulfuric acid tanks and solvent extraction cells will be bermed to contain any spillage of acid or solvent.

If you have any questions regarding this information, please let me know.

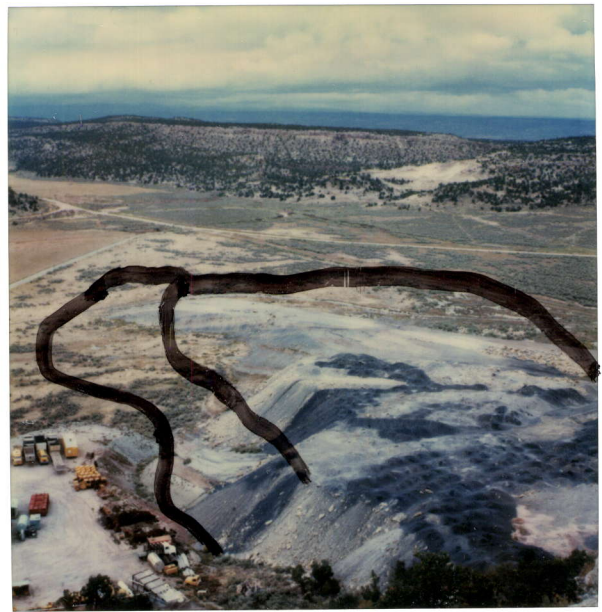
Very truly yours,  
HAZEN RESEARCH, INC.

A handwritten signature in cursive script, appearing to read "R. B. Coleman".

R. B. Coleman  
Vice President

RBC:mb

Lookine northwest down  
across existing waste  
dump and proposed new  
waste dump site.  
New dump outlined.



Looking southwest at  
profile of existing waste  
dump. Proposed new waste  
dump and haul road outlined.

#### 15. D. Water Discharge

No continuous active aquifers were encountered in the exploration drilling for which data is available. The holes that did encounter water were scattered and not contiguous. The wet intercepts were at various elevations indicating fracture filling only. The elevation which showed any consistency as to the presence of water was 325 feet below the surface. This elevation, 6175, is 100 feet below the proposed bottom of the pit. No discharge is present in the current pit limits. No water disposal or discharge is anticipated.

Approximately 700 feet northwest of the leach pad area, Pioneer Drilling drilled a test hole for Joseph Costanza to a depth of 1520 feet during September, 1985. No water was encountered. Approximately 700 feet southeast of the mill site, a test hole was drilled for Kelmene to a depth of 365 feet. No water was encountered. The entire length of the hole was in Brushy Basin Shale. Also during June, 1985 at the southern  $\frac{1}{4}$  corner of Section 36, Kelmene drilled another hole to a depth of 445 feet with no water encountered. From the hole tests, it appears that ground water is very rare in occurrence and if present, is of poor quality. The poor quality is probably due to the high content of  $\text{CaCO}_3$  cementing agent in the sedimentary beds as well as the gypsum in the clays. Both are water soluble over time. (See page 73 for water analysis from well).

Should water be encountered, it will have to be disposed of in an approved evaporation pond. Analysis of well water in the vicinity shows the ground water to be below dischargeable standards. The proposed discharge site is behind the existing dam immediately north of the mill site. This area is underlain by up to 350 feet of Brushy Basin (Jmb) Shales. (See Pocket C for geology). (See page 45 for Jmb Permeability tests).

#### 16. Process Water

Process water will be obtained for a well located north of the pit. (See attached water appropriation and assignments, page 54).

This water, although of poor quality, will be usable for the milling. The water will have to be pumped via pipeline to the mill. A BLM pipeline right-of-way has been applied for. (See page 23).

Potable water will be hauled from La Sal Livestock Co. Health Department approved source at La Sal, Utah or from Rio Algom Corps. approved source if they are still in operation. A 4000 gallon sanitary storage tank will be installed at the mill for human consumptive use. The anticipated use for 20 people with no showers at 25 gallon per person per day is 500 gallons per day.

RAYMOND E. KUNKEL  
33 HOLIDAY HAVEN  
HOMB. UTAH 84502

September 29, 1982

Daniel Condon, Hydrologic Engineer  
Utah Natural Resources & Energy  
74 West Main Street, P.O. Box 718  
Price, Utah 84501

RE: A-43173 (05-962)

Dear Mr. Condon:

Your letter of Sept. 21, to the Centennial Development Co. has been forwarded to me by James Quigley with a copy of his letter to you of Sept. 23.

The mining interest and water right applications etc., referred to have been assigned to me. However, our mining activities in this area are in a hold pattern due to the depressed metal market prices and the current recession.

I expect to be in Price after Oct. 15th and would like to drop in at your office and discuss this matter with you. We expect activities to resume in this area when the economic outlook for copper metals improves.

Sincerely,

*Raymond E. Kunkel jt.*

Raymond E. Kunkel

cc James Quigley

REK/jt

P.S.

Thanks Jim for referring Condon's letter to me.

Best Regards,



FORM 33

STATE OF UTAH

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RIGHTS

DEE C. HANSEN  
STATE ENGINEER

JOHN BENE  
DEPUTY

442 STATE CAPITOL  
SALT LAKE CITY, UTAH 84114

(801) 328-6071  
May 15, 1974

DIRECTING ENGINEERS  
HAROLD D. DONALDSON  
DONALD C. NORSETH  
EARL M. STAKER

Centennial Development Company  
34 Century Park-Way  
Salt Lake City, Utah 84115

Gentlemen:

RE: APPROVED APPL. NO. 43173 (05-962)

Enclosed find approved Application No. 43173 (05-962) . This is your authority to proceed with actual construction work which, under Sections 73-3-10 and 73-3-12, Utah Code Annotated, 1953, as amended, must be diligently prosecuted to completion. The water shall be put to beneficial use and proof of appropriation shall be made to the State Engineer on or before February 28, 1977 otherwise, the application shall lapse.

Failure on your part to comply with the requirements of the statutes may result in forfeiture of this application.

Yours truly,

Dee C. Hansen  
State Engineer

jb

Enc: Copy of Approved Application

APPLICATION APPROVED

APPLICATION TO APPROPRIATE WATER  
STATE OF UTAH

NOTE:--The information given in the following blanks should be free from explanatory matter, but when necessary, a complete supplementary statement should be made on the following page under the heading "Explanatory."

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, for uses indicated by (X) in the proper box or boxes, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

1. Irrigation ☐ Domestic ☐ Stockwatering ☐ Municipal ☐ Power ☐ Mining ☒ Other Uses ☐
  2. The name of the applicant is Centennial Development Company (A Utah Corporation)
  3. The Post Office address of the applicant is 34 Century Park-Way, Salt Lake City, Utah 84115
  4. The quantity of water to be appropriated 3 second-feet and/or ----- acre-feet
  5. The water is to be used for Mining from January 1 to December 31  
(Major Purpose) (Month) (Day) (Month) (Day)  
other use period Minor culinary uses from January 1 to December 31  
(Minor Purpose) (Month) (Day) (Month) (Day)  
and stored each year (if stored) from January 1 to December 31  
(Month) (Day) (Month) (Day)
  6. The drainage area to which the direct source of supply belongs is -----  
(Leave Blank)
  7. The direct source of supply is\* Underground Water  
(Name of stream or other source)  
which is tributary to -----, tributary to -----
- \*Note.--Where water is to be diverted from a well, a tunnel, or drain, the source should be designated as "Underground Water" in the first space and the remaining spaces should be left blank. If the source is a stream, a spring, a spring area, or a drain, so indicate in the first space, giving its name, if named, and in the remaining spaces, designate the stream channels to which it is tributary, even though the water may sink, evaporate, or be diverted before reaching said channels. If water from a spring flows in a natural surface channel before being diverted, the direct source should be designated as a stream and not a spring.
8. The point of diversion from the source is in San Juan County, situated at 7 points as follows: #1-South 360 ft. & East 540 ft.; #2-South 360 ft. & East 2250 ft.; #3-North 610 ft. & East 2980 ft.; #4-North 1460 ft. & East 2240 ft.; #5-North 1490 ft. & East 1140 ft.; #6-North 1370 ft. & West 20 ft.; #7-North 2230 ft. & West 1080 ft.; all from SW corner Section 25, T30S, R25E, SLBM LISBON VALLEY QUAD  
Note.--The point of diversion must be located definitely by course and distance or by giving the distances north or south, and east or west with reference to a United States land survey corner or United States mineral monument, if within a distance of six miles of either, or if at a greater distance, to some prominent and permanent natural object. No application will be received for filing in which the point of diversion is not defined definitely.
  9. The diverting and carrying works will consist of 6 inch and 8 inch diameter iron pipe  
(see attached sheet, Item 9)
  10. If water is to be stored, give capacity of reservoir in acre-feet ----- height of dam -----  
area inundated in acres ----- legal subdivision of area inundated -----  
50,000 gallon storage tank. NE 1/4, Sec. 35, T30S, R25E, SLBM
  11. If application is for irrigation purposes, the legal subdivisions of the area irrigated are as follows:  
-----  
-----  
----- Total ----- Acres
  12. Is the land owned by the applicant? Yes X No ----- If "No," explain on page 2.
  13. Is this water to be used supplementally with other water rights? Yes ----- No X  
If "yes," identify other water rights on page 2.
  14. If application is for power purposes, describe type of plant, size and rated capacity. -----
  15. If application is for mining, the water will be used in Lisbon Valley Mining District at the Centennial mine, where the following ores are mined Copper
  16. If application is for stockwatering purposes, number and kind of stock watered -----
  17. If application is for domestic purposes, number of persons -----, or families -----
  18. If application is for municipal purposes, name of municipality -----
  19. If application is for other uses, include general description of proposed uses -----
  20. Give place of use by legal subdivision of the United States Land Survey for all uses described in paragraphs 14 to 19, incl. Sec. 36, T30S, R25E (State section leased) Mining Claims  
in Sec. 25, 26, 35, T30S, R25E and Sec. 5 & 6, T31S, R26E.
  21. The use of water as set forth in this application will consume 3 second-feet and/or acre-feet of water and NO second feet and/or acre feet will be returned to the natural stream or source at a point described as follows: None

# FEES FOR APPLICATIONS TO APPROPRIATE WATER IN UTAH

Flow rate — c.f.s.	Cost
0.0 to 0.1 .....	\$ 10.00
over 0.1 to 0.5 .....	20.00
over 0.5 to 1.0 .....	30.00
over 1.0 to 15.0 .....	30.00 plus \$5 for each cfs above the first cubic foot per second.
over 15.0 .....	100.00
Storage — acre-feet	
0 to 20 .....	15.00
over 20 to 500 .....	30.00
over 500 to 7500 .....	30.00 plus \$5 for each 500 a.f. above the first 500 acre feet.
over 7500 .....	100.00

(This section is not to be filled in by applicant)

## STATE ENGINEER'S ENDORSEMENTS

- January 24, 1974 Application received <sup>by mail</sup> over counter in State Engineer's office by *JB*
- Priority of Application brought down to, on account of .....
- Jan. 24, 1974 Application fee, \$40.00, received by *W.A.* Rec. No. 00505
- Jan. 24, 1974 Application microfilmed by ..... Roll No. 7076
- Jan. 22, 1974 Indexed by *W.A.* Platted by 4/16/74 1410  
(D-30-25) 36.66.6 #1 #2 b.m. (D-30-25) 26 dad #6 #7 cl. b.
- January 24, 1974 Application examined by *JB* (D-30-25) 25 d.c.c. #3 ED #4 cad #5 c.b.d.
- Application returned, ..... or corrected by office .....
- Corrected Application resubmitted <sup>by mail</sup> over counter to State Engineer's office.
- FEB. 5, 1974 Application approved for advertisement by *WCK*
- FEB 22 1974 Notice to water users prepared by *dph. E.S.*
- FEB 28 1974 Publication began; was completed MAR 14 1974  
Notice published in *San Juan Record*
- FEB 27 1974 Proof slips checked by *dph. E.S.*
- Application protested by .....
- April 11, 1974 Publisher paid by M.E.V. No. 2-1403-AB
- Hearing held by .....
- Field examination by *WCK*
- MAY 8, 1974 Application designated for approval *WCK* 56.  
5-15-74 Application copied or photostated by *jb* proofread by .....
- 5-15-75 Application approved ~~rejected~~
- Conditions:

This Application is approved, subject to prior rights, as follows:

- Actual construction work shall be diligently prosecuted to completion.
- Proof of Appropriation shall be submitted to the State Engineer's office by 2-28-77
- 

*Dee C. Hansen*  
Dee C. Hansen, State Engineer

- Time for making Proof of Appropriation extended to .....
- Proof of Appropriation submitted.
- Certificate of Appropriation, No. ...., issued

EXPLANATORY

The following additional facts are set forth in order to define more clearly the full purpose of the proposed application:

This application is being filed to cover wells necessary to drain the area of an open pit copper mine being developed. The water produced will be used for the mining and concentrating of copper ores. No surplus will be discharged to the Lisbon Valley drainage. Water from the tailings ponds will be reclaimed.

An application for rights of way for pipelines has been made to the BLM over the mining claims from the well heads to the plant.

(Use page 4 if additional explanatory is needed.)

The quantity of water sought to be appropriated is limited to that which can be beneficially used for the purpose herein described

CENTENNIAL DEVELOPMENT COMPANY

*Joseph C. Bennett*  
Signature of Applicant\*  
Joseph C. Bennett, Chairman

\*If applicant is a corporation or other organization, signature must be the name of such corporation or organization by its proper officer, or in the name of the partnership by one of the partners, and the names of the other partners shall be listed. If a corporation or partnership, the affidavit below need not be filled in. If there is more than one applicant, a power of attorney, authorizing one to act for all, should accompany the Application.

DECLARATION OF CITIZENSHIP

STATE OF UTAH, }  
County of Salt Lake } ss

On the 18th day of January, 1974, personally appeared before me, a notary public for the State of Utah, the above applicant who, on oath, declared that he is a citizen of the United States, or has declared his intention to become such a citizen.

My commission expires: January 19, 1976

*Portia Williams*  
Notary Public

ATTACHMENT TO  
APPLICATION TO APPROPRIATE WATER  
STATE OF UTAH

Item 9

- #1 - An 8 inch diameter well between 350 and 375 feet deep with 960 feet of 6 inch and 320 feet of 8 inch conveyance pipe.
- #2 - An 8 inch diameter well between 350 and 375 feet deep with 50 feet of 6 inch and 2690 feet of 8 inch conveyance pipe.
- #3 - An 8 inch diameter well between 350 and 375 feet deep with 1220 feet of 6 inch conveyance pipe.

The conveyance pipe is connected with wells #1, 2 and 3 and discharges into a storage tank. Total length of 6 inch and 8 inch iron pipe is 2230 feet and 3010 feet respectively.

- #4 - An 8 inch diameter well between 300 and 350 feet deep with 1080 feet of 6 inch conveyance pipe.
- #5 - An 8 inch diameter well between 300 and 350 feet deep with 30 feet of 6 inch and 1270 feet of 8 inch conveyance pipe.
- #6 - An 8 inch diameter well between 300 and 350 feet deep with 30 feet of 6 inch and 240 feet of 8 inch conveyance pipe.
- #7 - A 10 inch diameter well between 300 and 400 feet deep with 1320 feet of 6 inch and 2280 feet of 8 inch conveyance pipe.

The conveyance pipe is interconnected with wells #4, 5, 6 and 7 and discharges into a storage tank. The total length of 6 inch and 8 inch iron pipe is 2460 feet and 3790 feet respectively.

Item 20

Section 36, T30S, R25E (leased State section) unpatented mining claims in Section 25, 26 and 35, T30S, R25E and Sections 5 & 6, T31S, R26E, SLBM. Lots 1, 2, 3 and 4, Section 1, T31S, R25E, SLBM (fee land lease). Section 31, T30S, R26E, SLBM.

The unpatented claims are as follows:

- Climax 1-2
- Sentinal 1-10
- Alpha 1-8
- CW 1-15
- Security 1-50
- Gamma 1-2

#3  
61.60 119-8550

QUIT-CLAIM DEED

APR 27 9 28 AM '77

ARYILLA E. WARREN  
RECORDER SAN JUAN COUNTY

G. M. Wallace & Co., a corporation organized and existing under the laws of the State of Colorado, with its principal office at Denver, of County of Denver, State of Colorado, grantor, hereby QUIT CLAIMS to Raymond E. Kunkel, grantee, an undivided 95% interest in the following described land in San Juan County, State of Utah and to Paul B. Clemons, grantee, an undivided 5% interest in the following described land in San Juan County, State of Utah:

The mining claims and interests, and the water rights, particularly described upon Exhibit A annexed and made a part hereof

reserving to grantor a right for the period ending December 31, 1980 to receive fifty per cent (50%) of the gross receipts payable with respect to the above-described claims and interests, said receipts to include receipts from all dispositions, encumbrances, leases and any development or operations of the above-described claims and interests. Grantor's fifty per cent (50%) interest in said gross receipts shall be limited to One Hundred Fifty Thousand Dollars (\$150,000.00).

The officers who sign this deed hereby certify that this deed and the transfer represented thereby was duly authorized under a resolution duly adopted by the board of directors of the grantor at a lawful meeting duly held and attended by a quorum.

In witness whereof, the grantor has caused its corporate name and seal to be hereunto affixed by its duly authorized officers, this 30<sup>th</sup> day of September, 1976.

Attest:

George O. Thummal, V. Pres.

G. M. Wallace & Co.

By Mr. Wallace, President

(Corporate Seal)

STATE OF COLORADO )

) ss.

CITY AND COUNTY OF DENVER )

On the 1<sup>st</sup> day of November, 1976, personally appeared before me George M. Wallace and George O. Thummal who being by me duly sworn did say, each for himself, that he, the said George M. Wallace is the president, and he, the said George O. Thummal is the secretary of G. M. Wallace & Co., and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its board of directors and said George M. Wallace and George O. Thummal each duly acknowledged to me that said corporation executed the same and that the seal affixed is the seal of said corporation.

NOTARY

PUBLIC

STATE OF COLORADO

My commission expires December 11, 1979

My residence is Silver Ridge, Colorado

Sarah L. Stinger

Notary Public

Parcel No. 24, State Lease

• All of Section 16, Township 30 South, Range 25 East, Salt Lake Meridian.

The GMW interest is the State of Utah Mineral Lease No. 30469 dated April 29, 1974, between Centennial Development and the State of Utah.

Parcel No. 25, Atlas Boundary Agreement

• Daisy D	Unknown	
• Yellow Rose	"	
• Fourteen	"	
• Bobwire	"	
• Electron	"	
• Gamma	"	
• Alpha	"	
• Eleven	"	
• Pinon	"	
• White Sage	"	
• Jack	"	
• Alpha (amended)	242	7
• Eleven (amended)	242	8
• Electron (amended)	242	3

The GMW interest is the locator's interest in such patented claims purchased from San Juan County and subject to a boundary agreement between Keystone Wallace Resources and Atlas Minerals Corporation.

Parcel No. 26, Area of Interest

All claims, fractions patented or unpatented, fee lands held outright or under lease, sales agreement, or otherwise within one mile of any of the boundaries described in Parcels 1-25.

Parcel 27, Water Rights

The rights to water listed below are recorded in the office of the State Engineer, State Capitol, Salt Lake City, Utah by water users' claim and application numbers.

In the name of Centennial Development Company  
• W. U. C. 05-962, Application 43173  
• W. U. C. 05-762, Application 39938  
• W. U. C. 05-935, Application 42698

In the name of Keystone Wallace Resources  
• W. U. C. 05-791, Application 40344, Certificate 9397  
• W. U. C. 05-154, Application 27072, Certificate 8836  
• W. U. C. 05-831, Application 49535  
• W. U. C. 05-685, Application 38357  
• W. U. C. 05-700, Application 38637

Parcel No. 31, G. M. Wallace Fraction

• G. M. Wallace Fraction	484	636
(amended)	487	129

The GMW interest is the locator's interest in such claims.

# 740  
6140

Recorded at 8:38 o'clock A.M., Arvilla E. Warren  
Reception No. 8548 JP Recorder.

THIS DEED, Made this 1st day of August 1976, between KEYSTONE WALLACE RESOURCES, a general partnership,

Recorder's Stamp  
APR 27 8 38 AM '77  
ARVILLA E. WARREN  
RECORDER, SAN JUAN COUNTY  
BY

of the county of and State of Colorado, of the first part, and

G. M. WALLACE & CO., a corporation organized and existing under and by virtue of the laws of the State of Colorado, of the second part:

WITNESSETH That the said party of the first part, for and in consideration of the sum of TEN and no/100 ----- DOLLARS,

to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and QUIT CLAIMED, and by these presents does remise, release, sell, convey and QUIT CLAIM unto the said party of the second part, its successors and assigns forever, all right, title, interest, claim and demand which the said party of the first part has in and to the following described Utah situate, lying and being in the County of San Juan and State of Colorado, to wit:

As described on Exhibit A hereto, consisting of seven (7) typewritten pages.

TO HAVE AND TO HOLD the same together with all and singular the appurtenances and privileges thereunto belonging or in anywise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, its successors and assigns forever.

IN WITNESS WHEREOF, The said party of the first part has hereunto set its hand and seal the day and year first above written.



Signed, sealed and Delivered in the Presence of

KEYSTONE WALLACE RESOURCES [SEAL]

by WALLACE RESOURCES, INC. [SEAL]

its General Partner [SEAL]

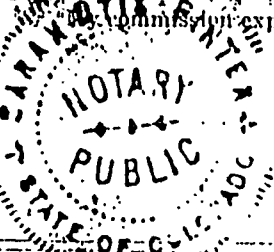
By George O. Hummel Pres. [SEAL]

STATE OF COLORADO,

City and County of Denver

ss.

The foregoing instrument was acknowledged before me this 1st day of November 1976, by G. M. Wallace, President of Wallace Resources, Inc., general partner of Keystone Wallace Resources. My commission expires December 17, 1979. Witness my hand and official seal.



Sarah H. Kirtley

Notary Public

Parcel No. 24, State Lease

All of Section 16, Township 30 South, Range 25 East, Salt Lake Meridian.

The KWR interest is the State of Utah Mineral Lease No. 30469 dated April 29, 1974, between Centennial Development and the State of Utah.

Parcel No. 25, Atlas Boundary Agreement

• Daisy D	Unknown	
• Yellow Rose	"	
• Fourteen	"	
• Bobwire	"	
• Electron	"	
• Gamma	"	
• Alpha	"	
• Eleven	"	
• Pinon	"	
• White Sage	"	
• Jack	"	
• Alpha (amended)	242	7
• Eleven (amended)	242	8
• Electron (amended)	242	3

The KWR interest is the locator's interest in such patented claims purchased from San Juan County and subject to a boundary agreement between Keystone Wallace Resources and Atlas Minerals Corporation.

Parcel No. 26, Area of Interest

All claims, fractions patented or unpatented, fee lands held outright or under lease, sales agreement, or otherwise within one mile of any of the boundaries described in Parcels 1-25.

Parcel 27, Water Rights

The rights to water listed below are recorded in the office of the State Engineer, State Capitol, Salt Lake City, Utah by water users' claim and application numbers.

In the name of Centennial Development Company

• W. U. C. 05-962, Application 43173  
• W. U. C. 05-762, Application 39938  
• W. U. C. 05-935, Application 42698

In the name of Keystone Wallace Resources

• W. U. C. 05-791, Application 40344, Certificate 9397  
• W. U. C. 05-154, Application 27072, Certificate 8836  
• W. U. C. 05-831, Application 49535  
• W. U. C. 05-685, Application 38357  
• W. U. C. 05-700, Application 38637

Parcel No. 31, G. M. Wallace Fraction

G. M. Wallace Fraction	484	636
(amended)	487	129

The KWR interest is the locator's interest in such claims.

386

#2  
18.10  
119-8549

Assignment of Mining Leases

APR 27 8 48 AM '77

ARVILLA E. WARREN  
RECORDER, SAN JUAN COUNTY  
BY \_\_\_\_\_

Know All Men By These Presents that

Keystone Wallace Resources, a general partnership (hereafter, "Assignor"), does hereby set over, convey and assign unto G. M. Wallace & Co., a Colorado corporation (hereafter, "Assignee") all of the right, title and interest of Assignor in and to the mining leases listed upon Exhibit A annexed hereto and made a part hereof, which said leases cover lands and mining claims listed on Exhibit A situated in San Juan County, Utah.

Such assignment is made without any representation or warranty, express or implied, as to title, good standing, or right to assign.

In witness whereof, Assignor has caused execution hereof by persons duly authorized so to do on its behalf, this 1st day of August, 1976.



KEYSTONE WALLACE RESOURCES  
by WALLACE RESOURCES, INC.,  
its General Partner

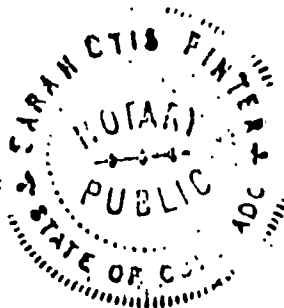
By George O. Hummel Pres.

STATE OF COLORADO )  
City and COUNTY OF Durango ) SS.

The foregoing instrument was acknowledged before me this 1st day of November, 1976, by George O. Hummel, President of Wallace Resources, Inc., general partner of Keystone Wallace Resources.

My commission expires: December 17, 1979.

Witness my hand and official seal.



Sarah C. Finter  
Notary Public

388

11.50 1C-12067

SEP 14 11 34 AM '76

Recorded at Request of Holland & Hart Attys

at 11.34 M. Fee Paid \$ 11.50 Arvilla E. Warren

ARVILLA E. WARREN  
RECORDER, SAN JUAN COUNTY

by J.P. Dep. Book 567 Page 109 Ref.: 111

Mail tax notice to \_\_\_\_\_ Address \_\_\_\_\_

## QUIT-CLAIM DEED

[CORPORATE FORM]

Centennial Resources Company (formerly Centennial Development Company), a corporation organized and existing under the laws of the State of Utah, with its principal office at Salt Lake City, of County of Salt Lake, State of Utah, grantor, hereby QUIT CLAIMS to

Keystone Wallace Resources,  
a partnership organized under the laws of Colorado,

for

for the sum of  
~~XXXXXXX~~  
DOLLARS  
~~XXXXXXX~~  
County,

the following described ~~tract~~ land in San Juan State of Utah:

The mining claims and interests, and the water rights, particularly described upon Exhibit A annexed and made a part hereof.

The officers who sign this deed hereby certify that this deed and the transfer represented thereby was duly authorized under a resolution duly adopted by the board of directors of the grantor at a lawful meeting duly held and attended by a quorum.

In witness whereof, the grantor has caused its corporate name and seal to be hereunto affixed by its duly authorized officers this 23rd day of June, A. D. 19 76

Attest:

James Dugley

Secretary.

Centennial Resources Company  
(formerly Centennial Development Company)

James Dugley

Vice President.

[CORPORATE SEAL]

STATE OF UTAH,

County of Alameda

ss.

On the 23rd day of June, A. D. 1976, personally appeared before me James Dugley and James Dugley, who being by me duly sworn did say, each for himself, that he, the said James Dugley, is the president, and he, the said James Dugley, is the secretary of Centennial Resources Company, and that the within and foregoing instrument was signed in behalf of said corporation by authority of a resolution of its board of directors and said James Dugley and James Dugley each duly acknowledged to me that said corporation executed the same and that the seal affixed is the seal of said corporation.

James Dugley

Notary Public.

My commission expires May 29, 1978 My residence is Alameda, California

It is the intention of this Deed to convey, and Grantor does hereby convey, all other mining claims and interests in mining claims now owned by Grantor contiguous to any of the claims listed above and situated in the Big Indian Mining District (organized), San Juan County, Utah and in the Lisbon Valley Mining District (unorganized), San Juan County, Utah.

Water Rights

Rights to the use of water, recorded in the office of the State Engineer, State Capitol, Salt Lake City, Utah by water users' claim and application numbers, as follows:

- W.U.C. 05-962, Application 43173; ✓
- W.U.C. 05-762, Application 39938;
- W.U.C. 05-935, Application 42698.

7.14.76	Entry No.	1C-12067	109
Recorded	At 11:34 A.M.	Book 567	Page 111
FEE PAID		ARVILLA E. WARREN	
		Recorder, San Juan County, Utah	
\$ 11.50	By <i>Arvilla E. Warren</i> Deputy		

*Return to -*

HOLLAND & HART  
500 Equitable Bldg.  
730 Seventeenth St.  
Denver, Colorado 80202

ATTN: Randy L. Parcel

## 18. Access Roads

All general access roads are in existence at present. New construction will involve the building of a mine haul road from the pit to the process area. Since only a single 35 ton truck will be hauling to the process area and a single truck hauling to the waste dump area, only a single lane roadway will be necessary. This haul road will be constructed 30 feet wide. The pit road will be cut as a bench-ramp along the north side of the pit and will steepen as the pit floor is lowered. At the lowest point in the pit, the grade will be +10% for 1600 feet to the surface. As the haul road traverses around the west end of the pit, it will be constructed of two feet thick waste sandstone fill covering the existing blowsand surface. This section is 600 feet long at a 0% grade. The haul road will go up at +5% grade for 700 feet along the toe of the existing waste dump. This waste material consists of shales and this portion will be covered with two feet of waste sandstone to provide adequate drainage and stability to the road. At this point, the haul road forks with one going to the waste disposal dump and the other continuing on to the process area. Continuing to the process area will require 1400 feet at +6% new construction. The first 550 feet of this construction will involve a cut in the sandstone outcrop hillside. To cut a 30 foot wide roadway with a cut slope of 1:1 will require the disturbance of 1.25 acres. The next 800 feet crosses a dry wash or gully. The proposal is to use mine waste as a 30 foot fill. (See page 72 for EPA Toxicity Tests). This section would also be covered with two feet of sandstone waste. A 48 inch diameter culvert would be installed to allow drainage to pass and a ditch constructed to keep the water from entering the pit. This ditch skirts the southeast end of the pit. The remaining 800 feet to the process area is at a -4% and would be on the natural grade and covered with a waste sandstone base. (See Pocket A).

The roadway would be ditched and the water diverted into natural drainages away from the pit area. The pit is located on a hill so drainage will pose no problem. Maintenance will be by routine use of motor grader. Fugitive dust tests show less than 3% of the sandstone base material to be -200 mesh. This condition coupled with the roadway being constructed on the protected leeward side of the hill from the prevailing southerly winds should minimize fugitive dust emissions. Weather charts show approximately 80 wet days per year and as necessary, water will be sprayed on the haul road to abate any dust problem. The nearest residential occupation is 13 miles to the northwest at La Sal, Utah so fugitive dust should not be any problem.

The public access road to the mill site is in existence and is maintained by San Juan County. (See Page 72 for Dust Analysis).



Existing Open Pit Mine:  
Looking northwest up  
Lisbon Valley.  
Proposed haul road out-  
lined in upper left.

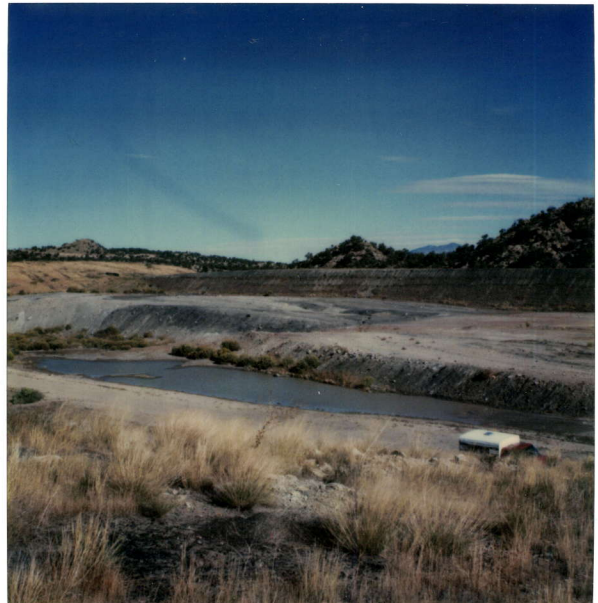


Site of proposed haul  
road fill across gully:  
Looking northeast across  
end of pit. Fill  
outlined across center  
of photo.



Process area looking northwest. Proposed leach heaps outlined in center of photo and Phase I tails pile to left edge.

Proposed mill site looking northwest at existing waste dump-dam and the 125,000 cubic yard reclaim stockpile on left center edge of photo.



## 19. Land Use

The area was used up to 1974 for open pit copper mining and waste disposal. Also the adjacent areas were used for winter livestock grazing.

The present use is for winter livestock grazing. The future use will be for winter livestock grazing during the proposed operation as well as after reclamation of the proposed operation.

## 20. Vegetation

Pinion trees are present on the southern 2200 feet of the haul road right-of-way. These will be pushed over and piled with a crawler tractor. The brush present in the tails and waste disposal areas is sagebrush. This also will be stripped with a crawler dozer. Pinion trees cover 6.4 acres of new disturbance, sagebrush and grasses cover 67 acres of the new disturbance. Some native grasses have naturally revegetated the 10 acres of previously disturbed land adjacent to the north side of the pit. The 19.6 acres covered by the existing waste dump has no vegetation cover. The pinion tree cover is 100% as no other species grow beneath their cover. The sagebrush is scattered with coverage of about 35% of available surface, the grasses made up of crested wheat, bunch grass and four wing salt grass covers about 60% of available surface area. The photos will show the various areas. (See page 67 to 69).

## 21. B, C, and D. Soils and Overburden

The vegetation topsoil is a mixture of blowsand and clay derived from the weathering of the surrounding sedimentary rocks. The depth of this material varies from zero adjacent to the steep outcrop to 50 feet out in the flats. The total area in the waste dump site to be covered is 36.4 acres. So using 40 acres of coverage one foot deep will require 65,000 cubic yards of reclaim material. The new disturbance covers 16.8 acres. Stripping two and one half (2.5) feet from 17 acres will provide the necessary 65,000 yards for covering the waste dump with one foot of soil cover. This soil will be stripped with a crawler dozer hauled to the nearby stockpile area by truck and deposited in a pile 20 feet high with a maximum 2:1 slope. (See Pocket A). The disposal site will be on flat ground so the material will not enter any drainage system. Once rained on the clays in the soil will form a crust to prevent the material from wind erosion. Similar material stockpiled but not utilized have remained stable with 2:1 slopes for in excess of 12 years.

The tails piles in the process area when reclaimed to a maximum of 3:1 slopes will cover an area of approximately 30 acres. Before reclamation, the leach tails piles will have a pH of 2.5 but will be neutralized by a milk of lime solution containing  $(\text{NH}_4)_2\text{SO}_4$ . The piles moisture content will be increased by 3% to an 18% volume moisture. Evapo-transpiration will leave the  $(\text{NH}_4)_2\text{SO}_4$  behind as a nitrogen source for revegetation. This lime-ammonia sulfate solution will be blended from the raffinate pond to 2gm/l concentration to produce an ammonia-sulfate concentration of 0.004 lbs/sq. feet.

See section 15, page 33 for description of overburden handling. See page 72 for EPA Toxicity Tests of waste and tails. The pH of the waste is 7.4 and the tails will be 6.5 to 7.0 after neutralization. These will be compatible with the natural soil pH of 8.6. (See page 72 for pH determinations).



**Hazen Research, Inc.**  
4601 Indiana St. • Golden, Colo. 80403  
Tel: (303) 279-4501 • Telex 45-860

September 18, 1985

Mr. Mel Swanson  
Kelmine Corporation  
P.O. Box 1383  
Moab, Utah 84532

Re: HRI Project 6084  
Lisbon Valley Copper Project

Dear Mr. Swanson:

A water sample and two soil samples were submitted by you for various tests and analysis. The samples are from your Lisbon Valley Copper property southeast of Moab, Utah.

Following are the test results.

1. Soil under proposed mine waste dump  
pH 8.6
2. Mine waste
  - (a) Cu 0.13%
  - (b) pH 7.4
  - (c) % minus 200 mesh 2.8%
  - (d) EPA Toxicity Test:

Element	Analyses (ppm)
As	<0.001
Ba	0.79
Cd	0.002
Cr	<0.01
Pb	0.25
Hg	<0.0001
Se	<0.001
Ag	<0.01

Mr. Mel Swanson  
September 18, 1985  
Page 2

3. Water sample from existing well

Hardness	2100 ppm
Chlorides	64 ppm
Dissolved solids	3300 ppm
Sulfates	2160 ppm

The test of the soils for pH was performed in accordance with the procedure shown in the U.S. Department of Agriculture, Soil Survey Manual, No. 18.

If you have any questions regarding the test data, please let me know.

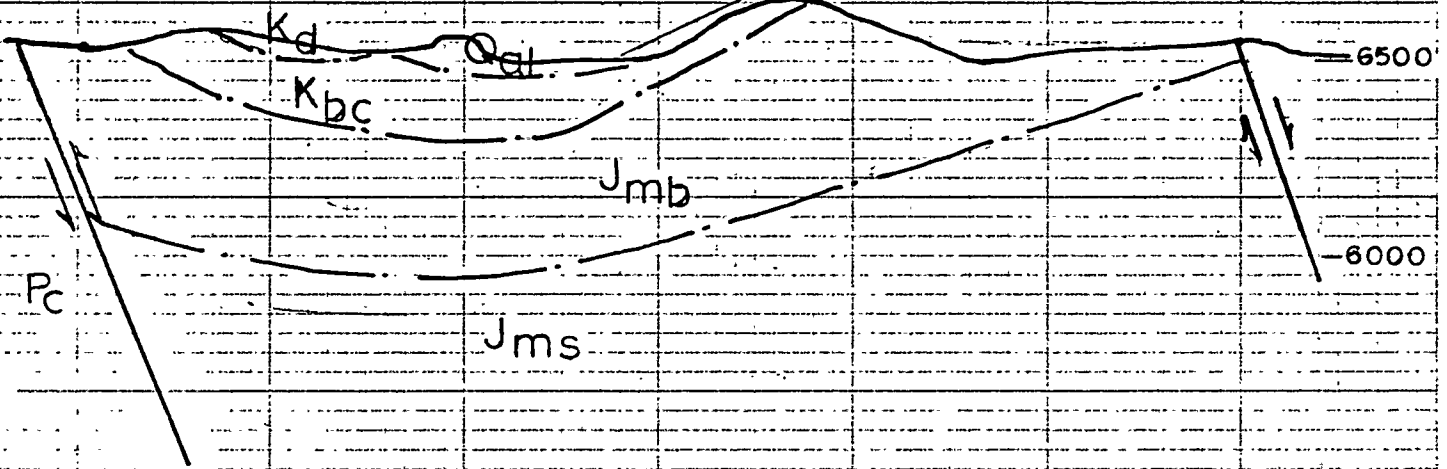
Very truly yours,  
HAZEN RESEARCH, INC.



R. B. Coleman  
Vice President

RBC:mb

Proposed Evaporation Pond  
(if needed)

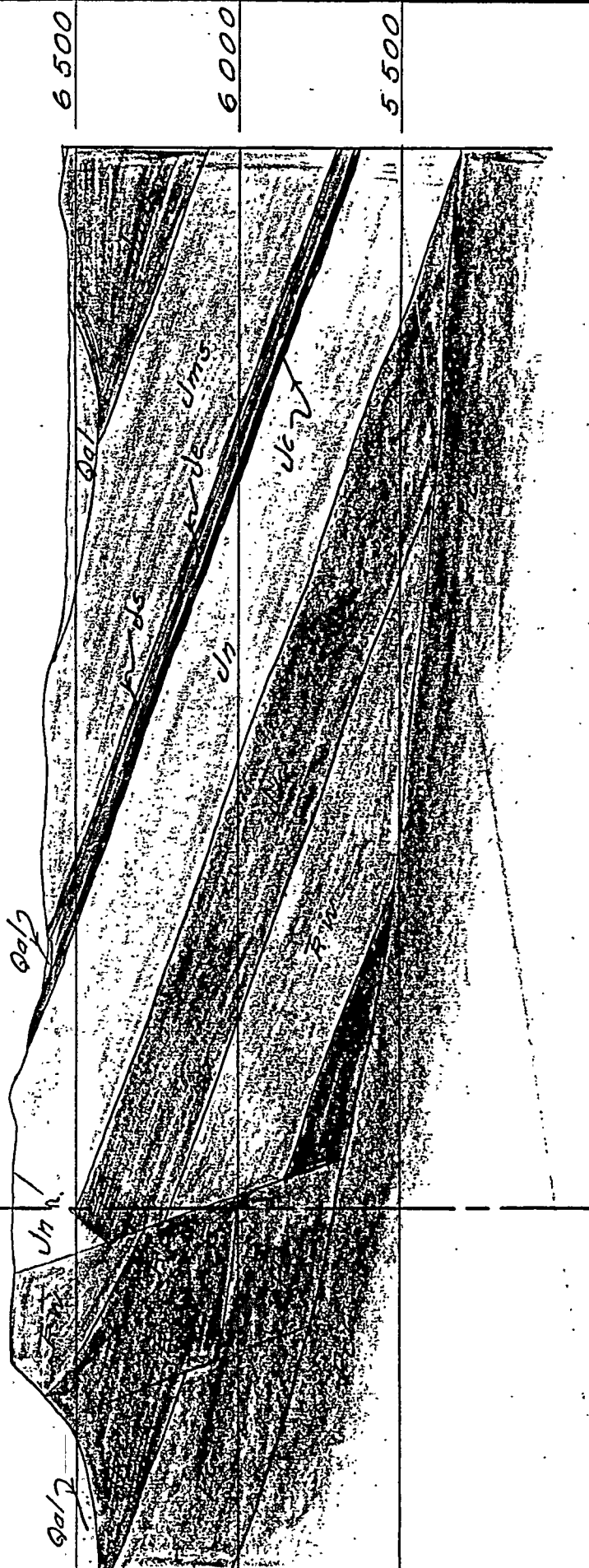


Section D-D

KELMINE CORP

SCALE 1in = 500ft

A-A'



SECTION C-C'  
SCALE 1"=500'  
R.H.G. FEB. 1974

## 22. Public Safety

No underground workings will be encountered so no protective measures are proposed. The exploration holes were drilled by the previous lease holder and it is assumed that they were adequately taken care of.

Solid refuse and trash will be hauled to the sanitary land fill in Moab, Utah. Liquid sewerage, both black and grey water, will be disposed of via a septic-leach field system. This system will be installed according to Public Health Division standards after percolation tests have been done. All spillage within the mill will be drained to a collection sump and pumped to the raffinate pond as outlined in the process description by Hazen Research, Inc. Waste oil and solvents will be stored in 1000 gallon tanks and periodically hauled off to Approved Drain Oil Service; M. H. Adams Inc., EPA Permit No. COD-060627262 in Commerce City, Colorado.

The liquor ponds and collection sumps associated with the leach piles will be fenced to prevent contact by either livestock or humans. The leach piles pose no health or injury problems as exposed. All entry points to both the process and mine areas will be posted with no entry warning signs to prevent public access. The pit edge will be fenced with four strand barbed wire with posts on 16 foot centers to prevent human and livestock from accidental encroachment onto the highwall. This fence will remain in place after completion of the project. The buildings and foundations will be dismantled and removed. The ponds neutralized and refilled with the excavated material.

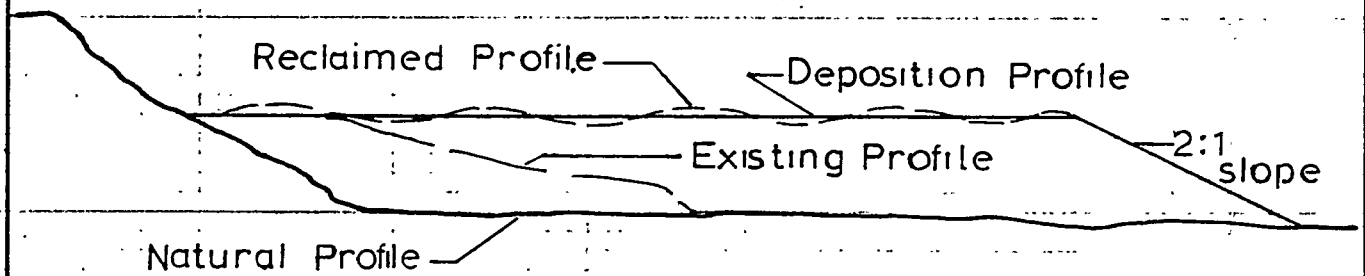
### 23. Grading and Soil Redistribution

A. See page 78 for Profile and Pocket A for Plan.

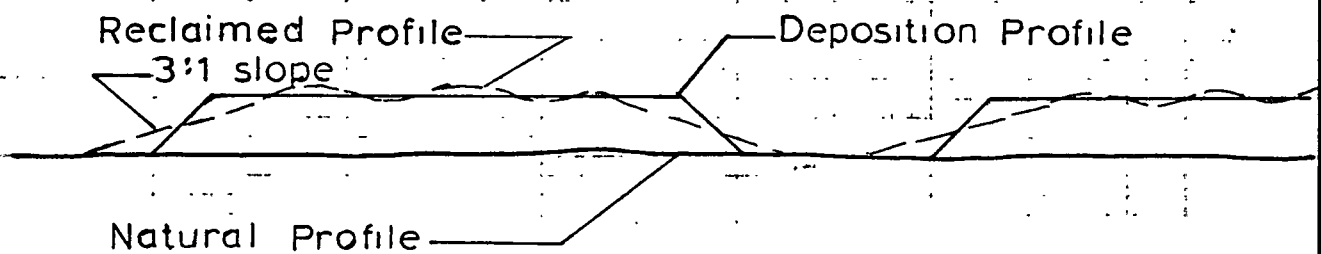
B. The waste dump will be deposited on a 2:1 slope and no regrading will be done upon completion of the project. (See Pocket A for Plan). The height of the dump at the northern end will be 90 feet. The southern end will blend into the steep hillside. The dump will be deposited on flat ground and will not cover any natural drainages. Erosion of the toe of the slope will not pose a problem. Compaction of the dump top will take place during the construction by the truck traffic. Upon completing any 10 acre portion, the top of the dump will be graded to form small five to ten foot high hills with 10:1 slopes to form a random rolling hill effect to trap rain water in the valleys to prevent any run-off erosion. No water impounding will take place. (See page 78 for Profile).

The leach piles will be constructed by a conveyor and will be deposited at the angle of repose. Upon completion of the pile, the piles will be regraded to a 3:1 slope by crawler dozer and the piles blended into each other to form a rolling hills topography. Compaction of these piles will be by crawler activity during reclamation. These piles will be ditched to avoid erosion of their slope toes. Testing will be by observation. (See page 78 for Profile). No regrading of pit walls is proposed.

SHOW THIS!



CROSS SECTION  
WASTE DUMP  
Looking West



CROSS SECTION  
TAILINGS PILE  
from  
HEAP LEACH  
Looking West

KELMINE CORP.  
P.O. Box 1383  
Moab, Utah 84532

## 24. Impoundments

The evaporation pond is not part of the design at present. But should it prove necessary, its location is in a drainage that has had an earthen dam 30 feet high previously built across it. This area now forms a run-off catchment where the water is used for livestock. The ponds formed by run off do not exceed one acre in areal extent. This impoundment was formed from spoil derived from the GTO pit to prevent run off from entering the GTO pit. The excessive size of the structure is due to its secondary use as a waste dump. The process ponds at the mill site will be neutralized by flushing with fresh water and the ponds filled back in upon completion of the project. No sediment ponds are used in the process. Revegetation of the process ponds and mill site will take place on the topsoil redeposited from the adjacent soil stockpile. The soil will be spread by crawler dozer.

WHAT  
HAPPENS TO  
THE RUNOFF  
H<sub>2</sub>O

The haul road fill across the gully will have a 48 inch culvert installed to maintain drainage from the 22.5 acre basin. A ditch from the downstream side of the culvert will divert the drainage around the southeast end of the pit and allow the water to enter the natural drainage system easterly away from the pit.

Waste dump and leach tails are both deposited on level ground so no toe erosion will take place. The slopes of the waste dump will be constructed at 2:1 and the leach tails will be regraded to a slope of 3:1 upon completion. Both piles will be constructed of unsorted mine run material. With large, 12 inch, rocks mixed with fines on the above stated slopes, downslope erosion will be prevented. Also, the tops of these piles upon completion will be graded in a random rolling hills topography with the hill to valley height of five to ten feet and slopes of 10:1. This effect will form mini-catchment basins for rain water and avoid the accumulation and sudden run off generated by large flat areas during thundershowers. These catchments formed by the hilly effect will retain the moisture needed for reseeding growth. Top soil will be redistributed over the tops and slopes of these piles to a depth of 12 inches by a crawler dozer and motor grader. Compaction will be by crawler dozer with the grozer marks running parallel to the contour to form small erosion barriers.

How?

The highwall areas will be ditched to divert rain water away from the pit both during and after the project. At present, little water accumulates in the bottom of the pit. The present highwalls have been standing for 12 years and there is no plan to reduce these walls upon completion of the project.

## 25. B. Revegetation

The grazing use is during the winter months. It is felt that with the rapid spring growth of the species used no protection will be required. If necessary, temporary fencing will be used to protect the areas until adequate growth is established.

## 25. D. Test Plots

At the end of Phase I, the 357,000 ton tails pile will be reclaimed. It will be constructed with 2:1 slopes and reclaimed with 2:1 slopes. This reclamation should begin approximately 2 to 2½ years after start up of the plant. The revegetation will be planted as stated below. No irrigation will be employed. The pile will be neutralized by a barren water - milk of lime solution. This water will contain 80gm/l  $(\text{NH}_4)_2\text{SO}_4$  but will be blended with water to form a concentration of 2gm/l  $(\text{NH}_4)_2\text{SO}_4$  which will precipitate during the evaporation process. Approximately .08 lbs. of  $(\text{NH}_4)_2\text{SO}_4$  per ton of tails will precipitate. This will add nitrogen to the pile to facilitate growth. This site will serve as a test plot to develop reclamation procedures for the project.

## 25. E. Revetation Plan

Revegetation Species	Rate	Season Planted
Four Wing Saltgrass	4 lb/Acre	Fall
Yellow Sweet Clover	3 lb/Acre	Fall
Crested Wheat Grass	3 lb/Acre	Fall
Indian Rice Grass	3 lb/Acre	Fall

The seedbed will be prepared by walking a crawler tractor over the surface leaving grozer indentation to trap the seeds and prevent erosion. The seed mixture will be spread by a centrifugal spreader towed by a crawler. This will be completed in mid-September to mid-October prior to the fall rains. The slopes generally are exposed in all directions. No mulch or general fertilizer use is planned. With exception of the four winged saltgrass, these species have been successfully established in the area.

## 25. F. Maintenance

If revegetation proves difficult on the test plot, professional consultation will be obtained from a public agency.

26. Construction and Reclamation Schedule

Function	Time Interval
1) Construction of Plant and Mine preparation.	6 to 8 Months
2) Phase I Oxide Mining and processing of 357,000 tons.	2 Years
3) (a) Reclamation of Phase I tails pile.	1 Year
(b) Begin Phase II Mining and Construction of leach pads 300,000 tons/pad.	1 3/4 Years Per Pad Total 7 Years
4) Reclaim each pad as it is finished every 2 3/4 to 3 years.	1 Year
5) (a) Mining ends $1.54 \times 10^6$ tons. Reclaim waste dump.	10 Years 1 Year
(b) Remove process plant and reclaim last leach pile.	2 Years

## 27. Surety Calculation

Function	Time	Cost	Total Cost
A) Clean up and remove structures/labor	1 Month	2 men @\$10/hr.	\$ 3,200.00
Equipment			2,500.00
B) Backfilling, grading contouring waste dump leach piles and plant site Total = 73.65 acres			
Using D-8 CAT	1 Month	\$95/hr.	16,000.00
C) Top soil distribution and stabilization: 113,500 cubic yards			
Haul	3 Months	\$0.60/yd.	68,100.00
CAT and Grader - Spread and Compact	2 Weeks	\$145/hr.	11,600.00
D) Revegetation:			
Seed Mix		\$25/acre	1,850.00
Labor	2 Weeks	2 men @\$10/hr.	1,600.00
CAT and Spreader: Equipment	1 Week	\$100/hr.	4,000.00
E) Labor - Miscellaneous	3 Months		7,500.00
F) Safety and Fence: 4 Wire around pit 7000 feet	1 Month	\$2.50/foot	17,500.00
G) Monitoring and Reseeding			
Monitor	1 Year	\$10,000	10,000.00
50% Reseed			3,725.00
ESTIMATED TOTAL RECLAMATION COST			\$147,575.00 =====

## CENTENNIAL DEVELOPMENT COMPANY

TABLE III-1STRATIGRAPHY

<u>Unit</u>	<u>Formation</u>	<u>Stratigraphic Description</u>	<u>Thickness</u>	<u>Unit</u>
1	Overburden		0 ft. - 40 ft.	1
2	Mancos		0 ft. - 70 ft.	2
3	Dakota	Carbonaceous Shale to Mudstone	10 ft. - 20 ft.	3
4		Buff Medium Grained Sandstone to Mudstone	15 ft. - 25 ft.	4
5		Mudstone to Sandstone	15 ft. - 25 ft.	5
6		Coal to Mudstone and Carbonaceous Sandstone	5 ft. - 20 ft.	6
7		Mudstone to Sandstone	10 ft. - 20 ft.	7
8		Coal to Mudstone & Carbonaceous Sandstone	5 ft. - 20 ft.	8
9		Mudstone	10 ft. - 25 ft.	9
10		Fine to Medium Grained Sandstone to Mudstone	15 ft. - 20 ft.	10
11		Medium Grained Sandstone	20 ft. - 60 ft.	11
12	Burro Canyon	Green Shale - Sandy	5 ft. - 25 ft.	12
13		Medium Grained Sandstone	20 ft. - 40 ft.	13
14		Variagated Red Sandstone	50 ft. - 120 ft.	14
15		Silica Fine Grained Sandstone	40 ft. - 100 ft.	15
16		Medium Grained Sandstone	5 ft. - 30 ft.	16
17	Jmb-Jms-Js- Je-Jc-Jn- Jk-Tw-Tc- Pc	(Jurassic, Triassic and Permian - see Plate 1.1)		17